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TECHNICAL REPORT

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This document is intended primarily for:
System and School Administrators
Education Stakeholders
Alberta Education Executive Team and Managers
Education Researchers

And may be of interest to:
Teachers
Parents

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Executive Summary

Grade Level of Achievement (GLA) is a tool parents, teachers and students can use to discuss a student's ongoing academic performance. It shows the grade level at which a student is functioning in relation to the grade in which he or she is currently enrolled. In the overwhelming majority of cases, the GLA will match up with the grade in which the student is enrolled. However, in some cases, it may show something of concern. For example, a student enrolled in grade seven may only have a level of mathematics or language arts achievement appropriate for a student in grade six. When this is the case, GLA can be used by parents, teachers and students to help develop effective strategies for improved learning.

GLA is a teacher's judgment of a student's achievement. It is based on the results from a large number of classroom assessments throughout the school year in relation to the desired learner outcomes in a core subject area. These classroom assessments typically include:

- teacher-designed quizzes, tests, essays, and projects
- external assessments such as provincial achievement tests in grades 3, 6 and 9
- the daily interaction between the teacher and the student.

GLA is communicated to parents as one component of these classroom assessments. As specified in the *Guide to Education: ECS to Grade 12* (Alberta Education, 2006a:103) GLA ensures students and parents understand the difference between "grade" as an enrolment designation and "grade" as a level of achievement. School authorities (teachers, administrators and trustees) decide how they want to communicate GLA to parents and students. Principals determine how to implement reporting of GLA, in consultation with teachers, parents and school councils and in a manner consistent with any related jurisdiction policies. This communication can take place in a wide variety of ways, including parent-teacher conferences, assessment portfolios, report cards or student work samples.

GLA data is also sent to Alberta Education. It is reported as a whole number in relation to the grade levels of the provincial programs of study for Language Arts, Mathematics and, if applicable, French Language Arts. Alberta Education uses the GLA data to determine how well a variety of programs are meeting the learning needs of students. Given the comprehensive foundation of many assessments of student achievement over time, GLA data should have good reliability and validity especially when the data is applied to groups of students.

Before the provincial education system started collecting GLA data, it relied on provincial achievement tests in Grades 3, 6 and 9 and Diploma exams (Grade 12) to determine how well students were doing. Schools, school authorities and Alberta Education used this information in their planning to enhance student success, but were required to wait three years to see the impact of their strategies. In addition to acknowledging the value of the teachers' professional judgement, the more balanced approach to classroom assessment represented by GLA will provide annual data for Grades 1 to 9. This will better inform the Ministry's research and program evaluation agenda. As a result, schools, school authorities and Alberta Education will receive more timely information about how well different populations of students are doing. This will allow educators to be more responsive to the learning needs of students. This information, when compiled as trend data, will also benefit students as they move from one

grade to the next, between schools, and from high school into post-secondary institutions or the world of work by ensuring students and parents have a clear understanding of their relative achievement strengths and challenges.

Alberta Education is committed to gathering the highest quality data possible. To do that, schools and teachers need to be assured the data will be used only for program evaluation purposes. To that end, GLA data will not be used as part of the Accountability Pillar wherein jurisdiction performance is evaluated. GLA is about identifying students who are under achieving, determining why and providing solutions.

Background

In 2003-04, the Beyond MIRS technical report was produced using preliminary GLA data largely provided by Edmonton School Jurisdiction No. 7. In 2005-06, one school from each jurisdiction was required to provide GLA data to Alberta Education with many jurisdictions submitting for more than one school. Jurisdictions were asked to submit their data to Alberta Education prior to July 7, 2006. Technical difficulties required the submission deadline be extended to September 25, 2006. Some jurisdictions had submitted invalid data which needed to be corrected prior to being included in this analysis. Consequently, forty-four jurisdictions and charter schools were included in this technical report. This represents approximately two thirds of the eligible school jurisdictions in the province.

Some of the technical challenges experienced with the 2005-06 pilot data management included inaccurate school codes or data submitted in formats that did not meet the database requirements. These types of errors will be prevented by software upgrades that will identify needed corrections before the data is submitted electronically to the Ministry.

This report describes the processes and outcomes associated with the 2005-06 Grade Level of Achievement (GLA) pilot data collection, data management and data analysis. Results of this and related studies of the 2005-06 GLA pilot will inform strategies for provincial implementation of GLA reporting. This report also is intended to support the four purposes for reporting GLA as defined in the GLA Handbook (2006b:4), specifically:

- to provide richer information at the system level (both jurisdictional and provincial) to inform effective practices to determine the impact of specific programs on student learning (e.g., English as a Second Language, special education needs) and to determine processes to further refine these programs;
- to act as a catalyst within the school's professional learning community to focus on individual student learning needs and interests;
- to determine effective practices and strategies for fostering higher levels of student achievement and confidence
- to contribute to the data or evidence used to report student achievement to parents/guardians, fulfilling the school's responsibility as outlined in the *Guide to Education: ECS to Grade 12* in the section entitled *Assessment as the Basis for Communicating Individual Student Achievement.*

Key Findings from the 2005-06 Analysis

- GLA data indicated that in English Language Arts 86%, in Mathematics 87% and in French Language Arts 95% of students are achieving at grade level.
- GLA data provides valuable information to help evaluate programs at each grade level and programming for different groups of students.
- GLA data confirmed that students who start school at a younger age than their peers struggle more in school and that this effect generally disappears by Grade 3 for English Language Arts and Grade 2 for Math.
- GLA data demonstrates that generally females significantly outperform males in Grades 2 to 9 in English Language Arts and in Grades 3 to 9 in Mathematics. However, male students with severe or mild/moderate learning disabilities outperform their female counterparts.
- GLA data shows that students that have high mobility (above average school registrations) have lower GLA scores.

How will GLA Information be Used?

The GLA data is intended for use by Alberta Education, school jurisdictions and schools.

Examples of Alberta Education data usage include:

- Assisting in evaluation of provincial initiatives or programs for specific student populations (e.g., English as a Second Language, Students with Mild/Moderate disabilities, First Nations, Métis and Inuit) and for curriculum evaluation, and other aspects of the department's areas of responsibility (e.g., What curriculum changes do we need to make to address the gender gap in performance in English Language Arts and Mathematics?).
- Conducting further research to answer questions such as:
  Why do students with mild and moderate cognitive disabilities perform less well than all categories of students with severe disabilities?
  Why do GLA and PAT results in Math 9 depart more dramatically than in other subjects/grades?

Examples of school jurisdiction and school usage include:

- Assisting jurisdiction staff in investigating issues identified in school or jurisdiction annual education results reports that point to areas where academic achievement for students may be further informed by analysis of GLA data. For example, are there underlying factors influencing student achievement such as significant differences between male and female students' achievement? Does age of the student or student mobility unduly influence achievement in specific subjects? Where large discrepancies are identified intervention strategies may be identified to remediate the subject or grade level(s) with low results.

- Using GLA data as a benchmark - jurisdiction staff may wish to compare their data over time or in relationship to provincial norms. For example, a principal or superintendent may be interested in comparing GLA trend results for the school or jurisdiction in relationship to provincial results or to schools in the jurisdiction with above average GLA results. This can lead to conversations regarding promising practices that have been demonstrated to improve student achievement in specific settings.

In future reports (2007-08), GLA data will be aligned with census data. School staff may use the GLA data to inform the question: how is student achievement affected by variables external to the school? Are there strategies the school should consider to respond to the observed relationships as a means to enhancing students' achievement levels? For example, if high poverty rates or a high percentage of mothers with significantly lower levels of education is related to lower GLA, collaborative community supports or early intervention programs might need to be considered to ensure students start school ready to learn.

Jurisdictions may also find it useful to access their GLA data and import it to their own systems in ways that permit more detailed analysis and drill down to deeper levels of analysis within their own unique context. For example, a jurisdiction may wish to purchase their own Cognos Cube software licence to support in-house analysis of data that is of unique interest to jurisdiction staff.

GLA data collected by Alberta Education will be available upon request to schools as a backup if student cumulative files are lost. If files are lost, GLA, PAT and related data can be used to replace missing information that may be lost as students transfer from school to school.

Study Limitations

Some limitations apply to this study, primarily relating to sampling. The student sample cannot be considered an unbiased sample of the provincial student population as participating schools in the pilot were not randomly selected. The data is not representative of the entire province therefore the report at this stage is intended to provide some indications about program impact but not to provide definitive answers.

Of the total 82,390 student GLA records included in this analysis:

- 2,181 (approximately 2.7%) had no GLA data submitted for English Language Arts (ELA)
- 2,776 (approximately 3.4%) had no GLA data submitted for Math.

Individualized Program Plan (IPP) data for students on a modified curriculum were submitted for 960 of the 82,390 students. For French Language Arts (FLA) students, counts for the "no GLA data submitted" category are unavailable at this time in the reporting process. Therefore, it was not possible to separate FLA students from ELA students who have no GLA provided. Consequently, the FLA percentages were calculated on the basis of the known FLA students for

whom data was available. Also, when data is broken down by various categories, the number of students categorized as 'above grade level' often is too small to be shown. In these cases it has been combined with students 'at or above grade level' except in some specific reporting categories.

Next Steps in Implementation

At the end of the 2006-07 school year, a minimum of 1/3 of schools in each jurisdiction will be reporting GLA to Alberta Education in Language Arts and Mathematics. In the 2007-08 school year all schools in jurisdictions, Francophone Authorities and Charter School Authorities will be reporting GLA for these two subjects and French Language Arts where applicable. Consequently, the report on the 2006-07 GLA data will start to apply the data to program evaluation purposes. The report on the 2007-08 data will have a very strong orientation to program evaluation functions and value-added GLA reports will be provided to all Grade 1-9 schools in Alberta.

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Introduction

This report describes the processes and outcomes associated with the 2005-06 Grade Level of Achievement (GLA) pilot data collection, data management and data analysis. Results of this and related studies of the 2005-06 GLA pilot will inform strategies for provincial implementation of the GLA reporting initiative. This report is also intended to support the four purposes for reporting GLA as defined in the GLA Handbook (Alberta Education, 2006b:4), specifically:

- to provide richer information at the system level (both jurisdictional and provincial) to inform effective practices to determine the impact of specific programs on student learning (e.g., English as a Second Language, special education needs) and to determine processes to further refine these programs;
- as a catalyst within the school's professional learning community to focus on individual student learning needs and interests;
- to determine effective practices and strategies to foster higher levels of student achievement and confidence; and
- to contribute to the data or evidence used to report student achievement to parents/guardians, fulfilling the school's responsibility as outlined in the *Guide to Education: ECS to Grade 12* in the section entitled *Assessment as the Basis for Communicating Individual Student Achievement.*

Why GLA Data is Important:

- The GLA data is intended for use by Alberta Education, school jurisdictions and schools.
- Examples of Alberta Education data usage are:
    - Using provincial-level GLA summary information to assist in evaluation of its initiatives or programs for targeted student populations and for curriculum evaluation, and other aspects of the department's areas of responsibility. For example, why do mild and moderate cognitively disabled students perform less well on GLA results than all categories of students with severe disabilities?
    - Conduct analysis of GLA data parameters to determine reliability and validity of GLA data. For example, do GLA and Provincial Achievement Test (PAT) correlations at the provincial level fall within acceptable range or point to anomalies relating to PAT results or classroom assessment practices that warrant further study. For example, why does GLA and PAT results in Math 9 depart more dramatically than in other subjects/grades?
- Examples of school jurisdiction and school usage include:
    - Assisting jurisdiction staff to investigate issues identified in school or jurisdiction annual education results reports that point to areas where academic achievement for students may be further informed by analysis of GLA data. For example, are there underlying factors influencing student achievement such as significant differences between male and female students' achievement or does age of the student or student mobility unduly influence achievement in specific subjects? Where large

discrepancies are identified intervention strategies may be identified to remediate the subject or grade level(s) with low results.

- Use GLA data as a benchmark jurisdictions may wish to compare their data over time or in relationship to provincial norms. For example, a principal or superintendent may be interested in comparing GLA trend results for the school or jurisdiction in relationship to provincial results or to schools in the jurisdiction with above average GLA results. This can lead to conversations regarding promising practices that have been demonstrated to improve student achievement in specific settings.
- GLA data collected by Alberta Education will be available upon request to schools as a backup to lost student cumulative files, whereby GLA, PAT and related data can be used to replace individual files that may be lost as students transfer from school to school.
- In future reports (2007-08), GLA data will be aligned with census data. School staff may use the GLA data to inform the question, how are our students' achievement affected by variables external to the school? Are there strategies the school should consider to respond to the observed relationships as a means to enhancing students' achievement levels? For example, if a schools student population has high poverty rates or a high percentage of mothers with significantly lower levels of education, collaborative community supports or early intervention programs might need to be considered to ensure students start school ready to learn.
- Jurisdictions may also find it useful to access their GLA data and import it to their own systems in ways that permit more detailed analysis and drill down to deeper levels of analysis within their own unique context.
- It is Alberta Education's intention that the data be of as high a quality as possible. Schools and teachers need to feel assured that the data will not be used for purposes for which it is not intended. To that end, the data will not be used to evaluate jurisdictional, school or teacher performance and the data will not be used as part of the Accountability Pillar.
- The bottom line is GLA is about identifying students who are under achieving, asking why and providing solutions systemically.

Limitations of the Data

When analyzing the data, the following limitations were noted:

- Of the total 82,390 records, 2,181 (approximately 2.7%) had no GLA data submitted for English Language Arts and 2,776 (approximately 3.4%) had no GLA data submitted for Math.
- IPP data were submitted for 960 students, meaning 1.18% of students sampled were not on a graded curriculum.
- For French Language Arts (FLA) students, counts for the 'no GLA data submitted' category are unavailable at this time in the reporting process. Therefore, it was impossible to separate FLA students from ELA students who have no GLA provided. Consequently the FLA percentages were calculated on the basis of the known FLA students for whom data was available.

- The student sample cannot be considered an unbiased sample of the provincial student population as participating schools in the pilot were not randomly selected.
- Because the data is not representative of the entire province, the report at this stage can provide some indications about program impact but not definite answers.
- When data is broken down by various categories the number of students categorized as 'above grade level' is too small to be shown. It has therefore been combined with students 'at or above grade level' except in several specific reporting categories.

GLA 2006 Data Collection

Jurisdictions and schools which use the current upgraded release of vendor software such as SIRS or Trevlac were successful in transmitting GLA data promptly and in the correct format. Jurisdictions not using vendor software needed to submit data either through submission of an Excel spreadsheet or an ASCII text file created using their own in-house application. A bug in the Excel software prevented the files from being created properly and were modified by an analyst after they arrived at Alberta Education. Microsoft was made aware of the issue. GLA data received on paper forms were returned to the jurisdiction as this violated FOIP controls in place to protect the personal information of students. Most files received through sources other than vendor software required some modification or were flagged as invalid and unusable. Jurisdictions not using supported vendor software indicated their reason for not using such software was the cost. The intended submission date for GLA data was July 7, 2006 which had to be extended to September 25, 2006 due to these technical difficulties.

The Edulink software was modified to allow users to enter GLA data in the proper format and submit the data to Alberta Education. Jurisdictions not using supported vendor software were sent technical instructions on how to create and send the data in the appropriate format. They also had access to an analyst and Helpdesk support at Alberta Education to assist them in creating and sending their data. Edulink was modified to allow users to enter GLA data without using Excel. The data used in this analysis was data submitted as of the end of September.[1] By that time, 44 jurisdictions had completed successful data submissions.

Adjustments for GLA 2007 Data Collection

It became apparent during the initial data transmission from the jurisdictions that the instructions were too cryptic for jurisdiction administrative staff. This was especially problematic for those jurisdictions not using vendor software to generate the GLA data file. Technical requirements were beyond the capabilities of some users, for example the requirement to create a "tilde delimited file." Future enhancements to Edulink will provide data entry and editing to ensure rules on the individual data fields are met.

The current naming convention and the inability of some staff to combine data from multiple schools was an issue. Edulink did not provide this functionality which required Alberta Education staff to combine the data on their behalf. This will be prevented from becoming a

[1] As of December 1, 2006 data has been submitted for 65 authorities, including 11 charter schools.

problem as GLA data reporting is expanded in 2007 by ensuring that changes are made to allow files to be combined in the future. Additional modifications to Edulink are required to ensure valid data is transmitted to Alberta Education. The next phase of GLA data management started in September 2006 in order to facilitate GLA data submissions for 2007.

Technical issues being identified and proposed to be addressed before 2007 submissions are due will not affect current project timelines. Controls are in place to ensure the files meet the technical requirements and the current defined reports are delivered as required. Training issues for field based staff will be handled by Alberta Education Helpdesk personnel as in the past when it comes to issues of student information system data transmissions, including GLA data. However, this area should be monitored to determine if data management training can be addressed with existing department resources allocated to student information system data sharing with schools.

Description of GLA data

There were 317 schools from 44 jurisdictions that submitted useable grade level of achievement data, reporting for 82,390 students, 960 of whom were not on a graded curriculum. The fields collected included student name (surname and given name), Alberta Student Number, and enrolled grade. "Enrolled Grade" was defined as the grade to which the student was assigned. Typically there is a strong relationship between a student's age, peer group and enrolled grade.

GLA was collected for all students on a graded curriculum as defined in the Alberta programs of study, including those with special needs, in the following fields where applicable:

- GLA in English Language Arts
- GLA in French Language Arts - (French as the Language of instruction or Immersion students)
- GLA in Mathematics

Grade Level of Achievement is defined as the grade level expressed as a whole number in relationship to the learning outcomes defined in the program of studies that teachers judged the student to have achieved at the end of the school year. A GLA Handbook (Alberta Education, 2006b) was developed and distributed in the 2005-06 school year to facilitate pilot school participation in GLA reporting. The handbook was subsequently revised based on feedback received and re-distributed in November 2006.

The GLA Handbook encourages teachers to consider GLA assessment in relationship to the full range of formative and summative assessment information available to them over the course of the school year in making a professional judgment of the student's grade level of achievement.

Students not on a graded curriculum also had data submitted. "Not on a Graded Curriculum" was meant to indicate that the student's program was restricted to learning outcomes that were significantly different from the provincial curriculum defined in the program of studies and were specifically selected to meet the student's special needs as defined in the *Standards for Special Education* (Alberta Learning, 2004). The information collected was teachers' ratings of

students' learning outcomes in three areas: communication skills, functional skills and academic readiness skills.

Communication skills referred to the development of expressive and/or receptive communication. This could be verbal communication and/or alternative modes of communication. Functional skills referred to skills that would assist the student in developing independence in the home, school and community. Academic readiness skills referred to skills that would prepare the student for learning outcomes in the programs of study.

The Alberta Student Number was used by Alberta Education staff to append data fields such as Provincial Achievement Test (PAT) results (both raw scores and achievement levels), student age, number of school registrations, any additional student special needs codes associated with the student, and starting date. Individual student identifiers were replaced with a discrete GLA data ID, leaving no personal identifiers in the dataset used in producing this report.

All jurisdiction and Charter School Authorities were required to report GLA in Language Arts and Math for at least one school in 2005/06. The table below outlines the number of schools submitting GLA data in each jurisdiction.

Table 1 – Jurisdictions Reporting GLA

Jurisdictions Reporting	**Number of Schools Reporting**
Aspen View Regional Division No. 19	1
Aurora School Ltd.	1
Battle River Regional Division No. 31	1
Buffalo Trail Public Schools Regional Division No. 28	1
Calgary Roman Catholic Separate School District No. 1	7
Calgary School District No. 19	36
Calgary Science School Society	1
Canadian Rockies Regional Division No. 12	1
Edmonton Catholic Separate School District No. 7	29
Edmonton School District No. 7	193
Elk Island Public Schools Regional Division No. 14	2
Foothills School Division No. 38	1
Fort McMurray Roman Catholic Separate School District No. 32	2
Foundations for the Future Charter Academy Charter School Society	1
Golden Hills School Division No. 75	1
Grande Prairie Roman Catholic Separate School District No. 28	1
Grande Prairie School District No. 2357	1
Grande Yellowhead Regional Division No. 35	1
Grasslands Regional Division No. 6	1
Greater Southern Public Francophone Education Region No. 4	1
Holy Family Catholic Regional Division No. 37	2
Holy Spirit Roman Catholic Separate Regional Division No. 4	2
Lakeland Roman Catholic Separate School District No. 150	8
Lethbridge School District No. 51	1
Living Waters Catholic Regional Division No. 42	1

Jurisdictions Reporting	Number of Schools Reporting
Livingstone Range School Division No. 68	1
Medicine Hat Catholic Separate Regional Division No. 20	1
Medicine Hat School District No. 76	2
New Horizons Charter School Society	1
Northern Gateway Regional Division No. 10	1
Northern Lights School Division No. 69	1
Northland School Division No. 61	1
Palliser Regional Division No. 26	1
Peace River School Division No. 10	1
Peace Wapiti School Division No. 76	1
Red Deer Public School District No. 104	1
Rocky View School Division No. 41	1
St. Albert Protestant Separate School District No. 6	1
St. Paul Education Regional Division No. 1	1
Westmount Charter School Society	1
Westwind School Division No. 74	1
Wetaskiwin Regional Division No. 11	1
Wild Rose School Division No. 66	1
Wolf Creek School Division No. 72	1
Total	317

The jurisdiction of Edmonton School District No. 7 submitted the largest amount of data (62% of the submitted records) in the 2005/06 pilot year. A pertinent question relates to whether Edmonton School District GLA data is substantially different from the other school authorities' GLA data given the fact that the Edmonton district schools have been reporting GLA to their central office for a number of years longer than the other pilot schools reflected in this analysis. This question was considered by comparing differences in the proportions of GLA reported by category (at, below, above or no GLA provided).

The most notable finding was that in every grade in both ELA and Math the other authority schools reported a higher proportion of GLA data in the 'Not Available or Not Applicable' category. This percentage ranged from 2.6% in Grade 5 ELA to 13.7% in Grade 1 ELA. This compared to a range of .1% in Grade 1 Math to 4.4% in Grade 8 Math for the Edmonton district schools. These differences do suggest that the additional experience with GLA reporting in the Edmonton district may contribute to better rates of meaningful GLA data input.

The other consistent pattern visible in the data is that the other authority schools tended to report significantly fewer students at grade level than their Edmonton counterpart. However, this might be equalized if the "no GLA" data from the other authority schools were factored in. The final consistent pattern worth noting was that the other authorities demonstrated a greater propensity (in Grades 2, 3, 4 and 6) to report significantly higher proportions of students above grade level in Math, suggesting a higher degree of vertical enrichment for gifted students in the other authorities schools.

The following table shows the jurisdictions that had submitted data but ran into technical issues with the data submission process. They may not have been included for various reasons such as invalid school codes. Efforts have been made to retrieve data for these schools where possible in order to provide GLA reports back to the schools; however, the timing of this work does not permit inclusion of the data in this analysis.

Table 2 – Jurisdictions Submitting Invalid Data

Jurisdictions Submitting Invalid Data	**Number of Schools Reporting**
Black Gold Regional Division No. 18	1
Boyle Street Education Centre	1
Calgary Arts Academy Society	1
Calgary Girls' School Society	1
CAPE Centre for Academic and Personal Excellence Institution	1
Chinook's Edge School Division No. 73	1
Clearview School Division No. 71	2
East Central Alberta Catholic Separate School Regional Division No. 16	1
East Central Francophone Education Region No. 3	1
Elk Island Catholic Separate Regional Division No. 41	1
Evergreen Catholic Separate Regional Division No 2	1
Fort Vermillion School Division No. 52	2
Greater St. Albert Catholic Regional Division No. 29	2
High Prairie School Division No. 48	2
Horizon School Division No. 67	2
Mother Earth's Children's Charter School Society	1
Prairie Land Regional Division No. 25	1
Prairie Rose Regional Division No. 8	1
Red Deer Catholic Regional Division No. 39	1
Total	25

Descriptive Statistics

The students are roughly evenly distributed by enrolled grade with 10-11% of the students in each grade cohort. The table below shows the distribution by enrolled grade (Grade 1 to 9).

Table 3 – Enrolled Grade Distribution

Enrolled Grade Distribution		
Enrolled Grade	**Frequency**	**Percent**
1	8,847	10.9
2	9,085	11.2
3	8,994	11.0
4	9,127	11.2
5	9,351	11.5
6	9,150	11.2
7	8,649	10.6
8	9,038	11.1
9	9,189	11.3
Total	81,430	100.0

Students could have been coded as severely disabled, mild/moderately disabled, gifted or talented or ESL. Those students who were not coded as any of those categories are termed 'non-coded'. The non-coded students make up the largest proportion of the sample as shown in the chart below. There is a discrepancy between the totals for enrolled grade distribution and the chart of students broken down by code. This discrepancy has resulted from the fact that some students are being coded in more than one category, e.g. an ESL student may also have a disability code. This suggests that approximately 690 students in the sample had double codes, assuming the absence of triple coding.

Table 4 – Types of Student Codes

Types of Student codes		
	Frequency	Percent
Non-Coded	66,627	81.1
Severe Disabilities	2,019	2.5
Mild/Moderate Disabilities	5,721	7.0
Gifted and Talented	2,166	2.6
ESL –Canadian-born	2,780	3.3
ESL – Foreign-born	2,808	3.4
Total	82,121	100

Grade Level of Achievement – Summary of Results

Students on a Graded Curriculum

There were 81,430 students involved in this sample for the 2005-06 school year. The distribution of students in each of the GLA categories by subject is shown in the table below.

Table 5- All Students, Provincial

All Students – Province

	Mathematics		English Language Arts		French Language Arts	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	7,096	8.71	9,119	11.20	210	4.85
GLA equal to enrolled grade	70,750	86.88	69,695	85.59	4,092	94.54
GLA above enrolled grade	808	0.99	435	0.53	26	0.60
No GLA provided[2]	2,776	3.41	2,181	2.68	-	-
Total	**81,430**	**100.00**	**81,430**	**100.00**	**4,328**	**100.00**

Students may have been coded as having a disability, being gifted and talented, and/or ESL. The students that are not coded are included in the table below, which shows that approximately 92% of students not coded are achieving equal to their enrolled grade in English Language Arts and Mathematics. In French Language Arts, 95% of the not coded students that have a GLA are achieving at their grade level.

Table 6 – Students Not Coded, Provincial

Students not coded (as mild/moderate, severe, gifted and talented, or ESL) – Province

	Mathematics		English Language Arts		French Language Arts	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	2,820	4.23	3,725	5.59	164	4.11
GLA equal to enrolled grade	61,668	92.56	61,212	91.87	3,798	95.25
GLA above enrolled grade	372	0.56	196	0.29	25	0.63
No GLA provided	1,767	2.65	1,494	2.24	-	-
Total	**66,627**	**100.00**	**66,627**	**100.00**	**3,987**	**100.00**

Severe Disabilities

There were 2,019 students coded as severely disabled who had GLA reported for English Language Arts and Mathematics. There were 13 students coded as severely disabled who had GLA reported for French Language Arts. The chart below presents students having a severely disabled code and their grade level of achievement.

[2] No GLA provided refers to missing data, a "not applicable" situation, or an error

Table 7 – Severe Disabilities, Provincial

Students coded as having Severe Disabilities – Provincial

	Mathematics		English Language Arts		French Language Arts	
	Number of students	**Percent of total enrolled (%)**	**Number of students**	**Percent of total enrolled (%)**	**Number of students**	**Percent of total enrolled (%)**
GLA below enrolled grade	842	41.70	901	44.63	3	23.07
GLA equal to enrolled grade	1,033	51.16	1,002	49.63	10	76.92
GLA above enrolled grade	11	0.54	5	0.25	0	0.00
No GLA provided	133	6.59	111	5.50	-	-
Total	**2,019**	**100.00**	**2,019**	**100.00**	**13**	**100.00**

More than half of students enrolled in Mathematics have a GLA equal to their enrolled grade (51%). In Language Arts slightly less than half of students have a GLA equal to their enrolled grade. Mathematics and Language Arts seem to be fairly similar in their GLA distribution. A very low proportion of French Immersion or French as the language of instruction students were coded as severely disabled.

The chart below provides information on all students who were on a graded curriculum and were coded as severely disabled, by their disability type. The majority of students coded as having a severe disability are students with an emotional or behavioural disability. Among the different types of severe disabilities, the distribution of students among GLA categories varies more widely than the overall severe disability distribution (see above table). Students with physical or behavioural disabilities or limitations make up the largest number of students with severe disabilities. A small number of students (5) coded as having a severe cognitive disability are still on a graded curriculum. Knowing the type of severe disability may aid in understanding the student distribution throughout GLA categories.

Table 8- Type of Severe Disability

Type of Severe Disability			Mathematics			English Language Arts		
	Frequency	**Percentage**	**% at or above grade level**	**% below grade level**	**% No GLA Provided**	**% at or above grade level**	**% below grade level**	**% No GLA Provided**
Severe Cognitive Disability	5	0.25	0.00	60.00	40.00	0.00	60.00	40.00
Severe Emotional /Behavioural Disability	1,255	62.22	54.90	40.32	4.78	54.18	41.91	3.90
Severe Multiple Disability	49	2.43	20.41	59.18	20.41	14.29	63.27	22.45
Severe Physical or Medical Disability	608	30.14	47.53	44.24	8.22	45.39	47.86	6.74
Deafness	77	3.82	53.25	35.06	11.69	37.66	54.55	7.79
Blindness	23	1.14	65.22	26.09	8.70	65.22	26.09	8.70
Total	**2,017**	**100.00%**	-	-	-	-	-	-

Note: Included in the chart at the top of the page were two cases of students coded as being ECS, which is invalid to this pilot as the GLA report does not include Kindergarten. Those two cases have been removed throughout the rest of the analysis.

In the above chart, students being 'at or above grade level' were combined into a single category. This was to accommodate the very small number of students who were achieving above grade level and would otherwise be too small a number to report separately. It should be noted that a number of students with a severe disability code are not on a graded curriculum and thus did not receive a GLA. Instead their IPP results were provided (see next section). The following chart illustrates the type of severe disability by student gender.

Table 9 – Type of Severe Disability by Gender

Type of Severe Disability by Gender				**Mathematics**			**English Language Arts**		
	Gender	**Frequency**	**Percentage**	**% at or above grade level**	**% below grade level**	**% No GLA Provided**	**% at or above grade level**	**% below grade level**	**% No GLA Provided**
Severe Emotional /Behavioural Disability	Male	1,048	52.1	56.3*	38.8**	4.9	54.7	41.4	3.9
	Female	207	10.3	47.8*	47.8**	4.4	51.7	44.4	3.9
Severe Multiple Disability	Male	27	1.3	18.5	63.0	18.5	11.1	70.3	18.5
	Female	22	1.1	22.7	54.5	22.7	18.2	54.5	27.3
Severe Physical or Medical Disability	Male	464	23.1	51.9**	42.0*	6.0**	48.5**	46.8	4.7**
	Female	144	7.2	33.3**	51.4*	15.3**	35.4**	51.4	13.2**
Deafness	Male	38	1.9	55.3	28.9	13.2	34.2	55.3	10.5
	Female	39	1.9	48.7	41.0	10.3	41.0	53.8	5.1
Blindness	Male	15	0.7	80.0	20.0	0.0	80.0	20.0	0.0
	Female	8	0.4	37.5	37.5	25.0	37.5	37.5	25.0
Totals	**Male**	**1,592**	**79.1****	-	-	-	-	-	-
	Female	**420**	**20.9****	-	-	-	-	-	-
	All	**2,012**	**100.00**	-	-	-	-	-	-

Note: When shown by gender, the number of students having a severe cognitive disability is too small to be shown in the above table.
*Denotes a significant difference between males and females within the same category ($p<0.05$).
** Denotes a significant difference between males and females within the same category ($p<0.01$).

When the students coded as having a severe disability are shown by gender, the large difference between genders becomes apparent. A much larger proportion of males than females were coded as being severely disabled. However, a significantly higher percent of the coded males were 'at or above grade level' than were coded females.

Mild/Moderate Disabilities

There were 5,719 students in the 2005-06 sample having mild or moderate disability codes in English Language Arts and Mathematics. In French Language Arts, 83 students were coded as having a mild or moderate disability. The chart below shows the mild or moderate students' distribution across GLA categories.

Table 10 – Mild/Moderate Disabilities

Students coded as having Mild/Moderate Disabilities – Provincial

	Mathematics		English Language Arts		French Language Arts	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	2,940	51.39	3,477	60.78	31	37.35
GLA equal to enrolled grade	2,500	43.70	1,998	34.92	52	62.65
GLA above enrolled grade	10	0.17	9	0.16	0	0.00
No GLA provided	271	4.74	237	4.14	-	-
Total	**5,721**	**100.00**	**5,721**	**100.00**	**83**	**100.00**

In both Mathematics and Language Arts the majority of students have a GLA below their enrolled grade. Further examination of the data shows that the data does not differ significantly by jurisdiction. That is, of those jurisdictions or schools who had students coded as having mild/moderate disabilities, their GLA distribution patterns were much the same as the one shown above.

The chart below shows the breakdown of students on a graded curriculum having a mild or moderate disability by the type of disability. The largest proportion of students coded as having a mild/moderate disability are students coded as having a mild cognitive disability or a learning disability. Students having a mild or moderate cognitive disability have by far the largest proportion of students attaining below their grade level. As in the severe disability chart, students who were 'at or above grade level' were combined into a single category due to the small number of students who were achieving 'above grade level'.

Table 11- Type of Mild/Moderate Disability

Type of Mild/Moderate Disability			Mathematics			English Language Arts		
	Frequency	Percentage	% at or above grade level	% below grade level	% No GLA Provided	% at or above grade level	% below grade level	% No GLA Provided
Mild Cognitive Disability	1,675	29.29	15.7	81.5	2.8	11.9	85.3	2.8
Moderate Cognitive Disability	50	0.87	18.0	80.0	2.0	14.0	82.0	4.0
Emotional/Behavioural Disability	464	8.11	66.4	25.6	8.0	68.5	25.0	6.5
Learning Disability	2,463	43.07	52.6	43.0	4.4	39.5	57.0	3.5
Hearing Disability	35	0.61	85.7	14.3	0.0	85.7	14.3	0.0
Visual Disability	5	0.09	80.0	20.0	0.0	60.0	40.0	0.0
Communication Disability	554	9.69	62.5	30.9	6.9	42.8	50.4	6.9
Physical/Medical Disability	261	4.56	59.8	36.4	3.8	60.2	36.8	3.1
Multiple Disability	212	3.71	45.8	40.6	13.7	39.2	49.5	11.3
Total	**5,719**	**100.0**	**-**	**-**	**-**	**-**	**-**	

Note: Included in the chart at the top of the page were two cases of students coded as being ECS, which is invalid to this pilot as the GLA report does not include Kindergarten. Those two cases have been removed throughout the rest of the analysis.

The following chart (next page) shows each mild/moderate disability type by gender.

Table 12 – Type of Mild/Moderate Disability by Gender

Type of Mild/Moderate Disability by Gender				Mathematics			English Language Arts		
	Gender	Frequency	Percentage	% at or above grade level	% below grade level	% No GLA Provided	% at or above grade level	% below grade level	% No GLA Provided
Mild Cognitive Disability	Male	965	16.9	15.9	81.1	3.0	10.3**	86.9*	2.8
	Female	710	12.4	15.5	82.0	2.5	14.2**	83.0*	2.8
Moderate Cognitive Disability	Male	24	0.4	16.7	83.3	0.0	12.5	87.5	0.0
	Female	26	0.5	19.2	76.9	3.9	15.4	76.9	7.7
Emotional/Behavioural Disability	Male	317	5.6	66.9	24.9	8.2	65.6*	27.1	7.3
	Female	147	2.6	65.3	27.2	7.5	74.8*	20.4	4.8
Learning Disability	Male	1,547	27.1	56.0**	39.3**	4.7	39.3	57.0	3.8
	Female	916	16.0	46.8**	49.1**	4.0	39.7	57.1	3.2
Hearing Disability	Male	15	0.3	80.0	20.0	0.0	66.7	33.3	0.0
	Female	20	0.4	90.0	10.0	0..0	100.0	0.0	0.0
Communication Disability	Male	361	6.3	64.8	26.6**	8.6**	40.7	50.4	8.9**
	Female	193	3.4	58.0	38.9**	3.1**	46.6	50.3	3.1**
Physical/Medical Disability	Male	184	3.2	68.5**	28.3**	3.3	67.4**	31.0**	1.6
	Female	77	1.4	39.0**	55.8**	5.2	42.9**	50.7**	6.5
Multiple Disability	Male	148	2.6	49.3	37.8	12.8	41.9	48.0	10.1
	Female	64	1.1	37.5	46.9	15.6	32.8	53.1	14.1
Totals	**Male**	**3,561**	**62.3****	-	-	-	-	-	-
	Female	**2,153**	**37.7****	-	-	-	-	-	-
		5,714	**100.0**	-	-	-	-	-	-

Note: When shown by gender, the number of students having a visual disability is too small to be shown in the above table.
*Denotes a significant difference between males and females within the same category ($p<0.05$).
** Denotes a significant difference between males and females within the same category ($p<0.01$).

The table above illustrates the gender differences in GLA categories across the mild/moderate disability types. The gender difference is most significant for students having a physical or medical disability.

When viewing the mild/moderate GLA data by grade, another pattern emerges. Generally, we would expect to see a gradual increase from Grade 1 though 9 in the number of students with a GLA below their enrolled grade. Instead, in English Language Arts the number of students being below grade level peaks at 71% in Grade 6. After Grade 6, the number of students below their grade level decreases to 48% by Grade 9. In Mathematics the difference between students 'at their grade level' and students 'below their grade level' is not as large as in Language Arts as the percentages range between 45-50% from Grades 1 through 9

Gifted and Talented

In this sample of students, 2,166 were coded as being gifted or talented in English Language Arts or Mathematics. There were 142 students in French Language Arts coded as being gifted or talented. Evidence based on GLA data analysis for gifted and talented students conducted in 2003-04 and 2005-06 suggest that most jurisdictions are employing horizontal enrichment at the students' enrolled grade rather than vertical enrichment where students are instructed at higher grade levels. The chart below shows the grade level of achievement distributions for students coded as being gifted or talented.

Table 13 – Gifted and Talented Students, Provincial

Students coded as gifted/talented – Provincial

	Mathematics		English Language Arts		French Language Arts	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	5	0.23	13	0.60	1	0.71
GLA equal to enrolled grade	1,486	68.61	1,929	89.06	141	99.29
GLA above enrolled grade	378	17.45	213	9.83	0	0.00
No GLA provided	297	13.71	11	0.51	-	-
Total	**2,166**	**100.00**	**2,166**	**100.00**	**142**	**100.00**

The general assumption with gifted/talented students is that they tend to perform better than the population of students as a whole. According to the above frequency table, we can see that the majority of gifted/talented students are performing equal to or above the enrolled grade level. Fewer than 1% of students are 'below grade level' for each subject. Gifted and Talented students are performing slightly better in Mathematics than in English Language Arts with about 8% more students having a GLA 'above grade level' in Math. A possible explanation for the difference in number of students 'above grade level' is due to type of enrichment (horizontal or vertical). The findings above suggest that gifted and talented students are more likely to be receiving vertical enrichment in Math and horizontal enrichment in English Language Arts. Also of note is the higher percentage of 'no GLA provided' for Mathematics than for English Language Arts. There are additional substantive issues associated with the data on gifted and talented students, such as how does application of vertical or horizontal enrichment influence perceptions of the overall levels of school success. This area will benefit from further study as additional data becomes available in the future.

English as a Second Language

For English as a Second Language (ESL) students, there were two groups of student codes. The first are ESL students who are coded as Canadian-born (303). Of this group of students there were 2,780 in English Language Arts and Mathematics and 70 students in French Language Arts. For ESL students who are coded as Foreign-born (301), there were 2,808 in English Language Arts and Mathematics and 55 in French Language Arts. The distribution of both groups' GLAs are shown in the charts below.

Table 14- Canadian-born ESL Students, Provincial

Students coded as English as a Second Language – Canadians-born (303) - Provincial

	Mathematics		English Language Arts		French Language Arts	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	428	15.40	649	23.35	4	5.71
GLA equal to enrolled grade	2,100	75.54	1,896	68.20	65	92.86
GLA above enrolled grade	27	0.97	13	0.47	1	1.42
No GLA provided	225	8.09	222	7.99	-	-
Total	**2,780**	**100.00**	**2,780**	**100.00**	**70**	**100.00**

Table 15- Foreign-born ESL Students, Provincial

Students coded as English as a Second Language - Foreign-born (301) - Provincial

	Mathematics		English Language Arts		French Language Arts	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	410	14.60	756	26.92	9	16.36
GLA equal to enrolled grade	2,191	78.06	1,862	66.31	46	83.63
GLA above enrolled grade	22	0.78	17	0.61	0	0.00
No GLA provided	184	6.55	173	6.16	-	-
Total	**2,808**	**100.00**	**2,808**	**100.00**	**55**	**100.00**

The above tables show that both Canadian-born and Foreign-born ESL students follow a similar pattern to one another. Approximately 75-80% of each ESL group is attaining a GLA that is equal to or above enrolled grade in Math and about 66-69% are equal to or above grade level in ELA. Although findings in the *K-12 ESL Implementation Review* showed that Canadian-born ESL students are at more of a disadvantage than are Foreign-born, the tables show that they are somewhat similar to each other. This difference could be based on the type of data being examined. In this study GLA data is being examined whereas PAT and Diploma data was examined for the *Review*.

Students self-identified as Aboriginal

Of students who were self-identified as Aboriginal there were 4,407 in English Language Arts and Mathematics and 86 in French Language Arts. The distribution of this group's GLAs are shown in the chart below.

Table 16 – Students Self-Identified as Aboriginal, Provincial

Students self-identified as Aboriginal - Provincial

	Mathematics		English Language Arts		French Language Arts	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	998	22.65	1,191	27.03	8	9.30
GLA equal to enrolled grade	3,297	74.81	3,104	70.43	78	90.70
GLA above enrolled grade	9	0.20	12	0.27	0	0.00
No GLA provided	103	2.34	100	2.27	-	-
Total	**4,407**	**100.00**	**4,407**	**100.00**	**86**	**100.00**

The above table shows the distribution of self-identified Aboriginal students among the GLA categories. The total number of self-identified Aboriginal students is small (4,407) compared to the total sample (81,430). The majority of Aboriginal students have a GLA equal to their enrolled grade for all subjects (70.0%+). A larger proportion of Aboriginal students achieved a GLA equal to enrolled grade in Mathematics (74.8%) than English Language Arts (70.4%). The number of Aboriginal students in French Language Arts is very small at only 86 students. When comparing the proportion of Aboriginal students to all students in the sample, a lower percentage of Aboriginal students achieved a GLA equal to their enrolled grade in ELA and in Math, as compared to all students for whom data was submitted.

Gender

Students' GLA was broken down by gender in order to observe any patterns that may emerge. In this sample of students there was a larger number of males than females. The charts below show students' GLA by gender in each of the three subjects.

Table 17 – Gender, Mathematics, Provincial

Gender - Provincial	Mathematics			
	Female		Male	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	3,090**	7.78	4,006**	9.60
GLA equal to enrolled grade	34,905**	87.89	35,845**	85.93
GLA above enrolled grade	332**	0.84	476**	1.14
No GLA provided	1,387	3.49	1,389	3.33
Total	**39,714**	**100.00**	**41,716**	**100.00**

*Denotes a statistically significant difference between males and females within the same category ($p<0.05$).
** Denotes a statistically significant difference between males and females within the same category ($p<0.01$).

Table 18 – Gender, English Language Arts, Provincial

Gender - Provincial	English Language Arts			
	Female		Male	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	3,497**	8.81	5,622**	13.48
GLA equal to enrolled grade	34,908**	87.90	34,787**	83.39
GLA above enrolled grade	219*	0.55	216*	0.52
No GLA provided	1,090	2.74	1,091	2.62
Total	**39,714**	**100.00**	**41,716**	**100.00**

*Denotes a statistically significant difference between males and females within the same category ($p<0.05$).
** Denotes a statistically significant difference between males and females within the same category ($p<0.01$).

Table 19 – Gender, French Language Arts, Provincial

Gender - Provincial	French Language Arts			
	Female		Male	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	82**	3.51	128**	6.43
GLA equal to enrolled grade	2,242**	95.93	1,850**	92.92
GLA above enrolled grade	13	0.56	13	0.65
No GLA provided	-	-	-	-
Total	**2,337**	**100.00**	**1,991**	**100.00**

*Denotes a statistically significant difference between males and females within the same category ($p<0.05$).
** Denotes a statistically significant difference between males and females within the same category ($p<0.01$).

The three tables above show the frequency of female and male students in each of the GLA categories in Mathematics, English Language Arts, and French Language Arts. Overall, the distribution of females and males in each of the GLA categories (below, equal, or above) is similar for each subject area. For each subject, the majority of both males and females achieve a

GLA that is equal to their enrolled grade (80.0%+). Further, in all three subjects, a slightly greater proportion of females than males achieved a GLA equal to their enrolled grade. The difference between females and males in achieving a GLA equal to their enrolled grade is most notable for English Language Arts (87.79% and 83.40% respectively) than for Mathematics and French Language Arts. This finding in part parallels results from previous studies, such as analyses of the PISA data[3], which found that females tend to outperform males in reading, while males outperform females in mathematics. In addition, the 2003-04 GLA data demonstrated the same result as the current data, that is, females outperformed males in both Mathematics and English Language Arts.

GLA and Gender

The 2003 analysis of PISA results found that in overall performance females did much better than males in reading, but males slightly outperform females in mathematics. As another test of the concurrent validity of the GLA data, a gender analysis using Mathematics and English Language Arts means was conducted.

Both Mathematics and English Language Arts data were grouped by male and female, according to grade. Each grade's GLA was totalled, and a mean was calculated. The mean differences between males and females were compared using a T-test for means calculation. The same was done using the Grade 3, 6 and 9 PAT raw scores. A significance value less than or equal to 0.05 can be considered statistically significant. The following tables were produced.

[3] PISA 2003 — The 2003 Canadian Report
Measuring Up: Canadian Results of the OECD PISA Study
The performance of Canada's Youth in Mathematics, Reading, Science and Problem Solving
2003 First Findings for Canadians Aged 15

Table 20 – English Language Arts T-Tests

English LA GLA T-Tests

Enrolled Grade	*Gender*	*N*	*Mean GLA*	*Sig.*
1	M	3,518	1.01	.232
	F	3,562	1.01	
2	M	4,356	1.89	.000
	F	4,161	1.93	
3	M	4,511	2.84	.000
	F	4,236	2.89	
4	M	4,633	3.79	.000
	F	4,281	3.86	
5	M	4,664	4.75	.000
	F	4,535	4.81	
6	M	4,689	5.71	.000
	F	4,280	5.80	
7	M	4,350	6.75	.000
	F	4,127	6.87	
8	M	4,489	7.77	.000
	F	4,444	7.88	
9	M	4,571	8.77	.000
	F	4,466	8.87	

English LA PAT T-Tests

Enrolled Grade	*Gender*	*N*	*Mean PAT Score*	*Sig.*
3	M	4,244	68.50	0.00
	F	4,088	71.03	
6	M	4,304	64.90	0.00
	F	4,039	68.36	
9	M	4,139	66.77	0.00
	F	4,154	71.42	

Table 21 – Math T-Tests

Math GLA T-Tests

Enrolled Grade	*Gender*	*N*	*Mean GLA*	*Sig.*
1	M	4,080	1.01	.911
	F	4,024	1.01	
2	M	4,495	1.96	.240
	F	4,293	1.95	
3	M	4,530	2.91	.169
	F	4,250	2.92	
4	M	4,640	3.87	.322
	F	4,274	3.88	
5	M	4,660	4.83	.676
	F	4,521	4.84	
6	M	4,670	5.80	.050
	F	4,266	5.83	
7	M	4,212	6.83	.000
	F	3,941	6.88	
8	M	4,254	7.80	.000
	F	4,197	7.89	
9	M	4346	8.78	.000
	F	4217	8.85	

Math PAT T-Tests

Enrolled Grade	*Gender*	*N*	*Mean PAT Score*	*Sig.*
3	M	4,240	34.07	0.00
	F	4,083	33.12	
6	M	4,335	37.60	0.00
	F	4,054	36.64	
9	M	4,162	32.35	0.706
	F	4,166	32.44	

The above tables show that, in terms of GLA, females outperformed males in English Language Arts by small margins in Grades 2-9, but the differences were nonetheless statistically significant. The difference between males' and females' mean scores in math were not as pronounced, however they were significant in Grades 6-9, where again, females performed slightly better than males. When examining the PAT results, the difference between males and females was statistically significant in English Language Arts with females outperforming males in Grades 3, 6 and 9. In math there was a statistically significant difference between males and females in Grades 3 and 6 with males outperforming females. By Grade 9 females are outperforming males, although not to a statistically significant degree.

Discussion

The results of the gender analysis of GLA data demonstrate concurrent validity with the 2003 PISA gender based results in language arts. However, the GLA math data, while demonstrating no statistically significant differences between males and females in Grades 1-5 do demonstrate that females have a significantly higher GLA than males in Grades 6-9.

Student Mobility

Student mobility is captured twice a year, once at the end of September and again in March, by the Student Information System (SIS). The Student Mobility Indicator (SMI) provides information on the number of times a student has changed schools since entry into the Alberta school system. The SMI is calculated by counting the number of different school registrations each student has up until the most recent calendar year. All students start with a SMI of '1'; a student with an SMI of '2' has moved schools once. Low mobility is defined as having an SMI of '5' or less (i.e. a student has had 5 different school registrations or less) and high mobility is an SMI of '6' or greater. The three charts below show, for each subject, GLA results for students of high and low mobility respectively. The SMI may underestimate of the number of times students have changed schools, as SMI is only captured twice a year.

Table 22 – Student Mobility, Mathematics, Provincial

Mobility - Provincial	Mathematics			
	High		Low	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	864**	24.64	6,038**	7.78
GLA equal to enrolled grade	2,472**	70.51	68,198**	87.85
GLA above enrolled grade	20**	0.57	785**	1.01
No GLA provided	150**	4.28	2,608**	3.36
Total	**3,506**	**100.00**	**77,629**	**100.00**

** Denotes a statistically significant difference between high and low mobility within the same category ($p<0.01$).

Table 23 – Student Mobility, English Language Arts, Provincial

Mobility - Provincial	English Language Arts			
	High		Low	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	873**	24.90	8,054**	10.37
GLA equal to enrolled grade	2,529**	72.13	67,087**	86.42
GLA above enrolled grade	19	0.54	411	0.53
No GLA provided	85	2.42	2,077	2.68
Total	**3,506**	**100.00**	**77,629**	**100.00**

** Denotes a statistically significant difference between high and low mobility within the same category ($p<0.01$).

Table 24 – Student Mobility, French Language Arts, Provincial

Mobility - Provincial	French Language Arts			
	High		Low	
	Number of students	Percent of total enrolled (%)	Number of students	Percent of total enrolled (%)
GLA below enrolled grade	5**	17.24	205**	4.77
GLA equal to enrolled grade	24**	82.75	4,066**	94.62
GLA above enrolled grade	0	0.00	26	0.61
No GLA provided	-	-	-	-
Total	**29**	**100.00**	**4,297**	**100.00**

** Denotes a statistically significant difference between high and low mobility within the same category ($p<0.01$).

The vast majority of students can be described as having low mobility (95.3% of all students with GLA data). One of the most salient observations from the above tables is that a greater proportion of high mobility students have a GLA below their enrolled grade level compared to low mobility students. This observation supports the hypothesis that mobility negatively affects student achievement.

As noted above, student mobility was calculated based on the number of different school registrations a student had accumulated. Each student begins with an SMI of 1, indicating that they have been registered in one school. When a student registers in a different school, the SMI will increase by 1. The chart below lists the student mobility indicator values and the number of students having each SMI.

Table 25 – Student Mobility Indicator

Student Mobility Indicator (SMI)

Indicator	Frequency	Percent
1	34,835	42.9%
2	23,320	28.7%
3	11,206	13.8%
4	5,389	6.6%
5	2,877	3.5%
6	1,609	2.0%
7	858	1.1%
8	463	0.6%
9	269	0.3%
10	149	0.2%
11	83	0.1%
12	43	0.1%
13	16	0.0%
14	11	0.0%
15/16	7	0.0%
Total	**81,137**	**100%**

The chart above shows approximately 85% of students in our sample had 3 or fewer different school registrations. The following chart displays SMI by GLA above or equal to enrolled grade as well as by GLA below enrolled grade for English Language Arts. The counts of students differ from the above chart as some students may have no GLA information available.

Table 26 – Student Mobility Compared to GLA levels in English Language Arts

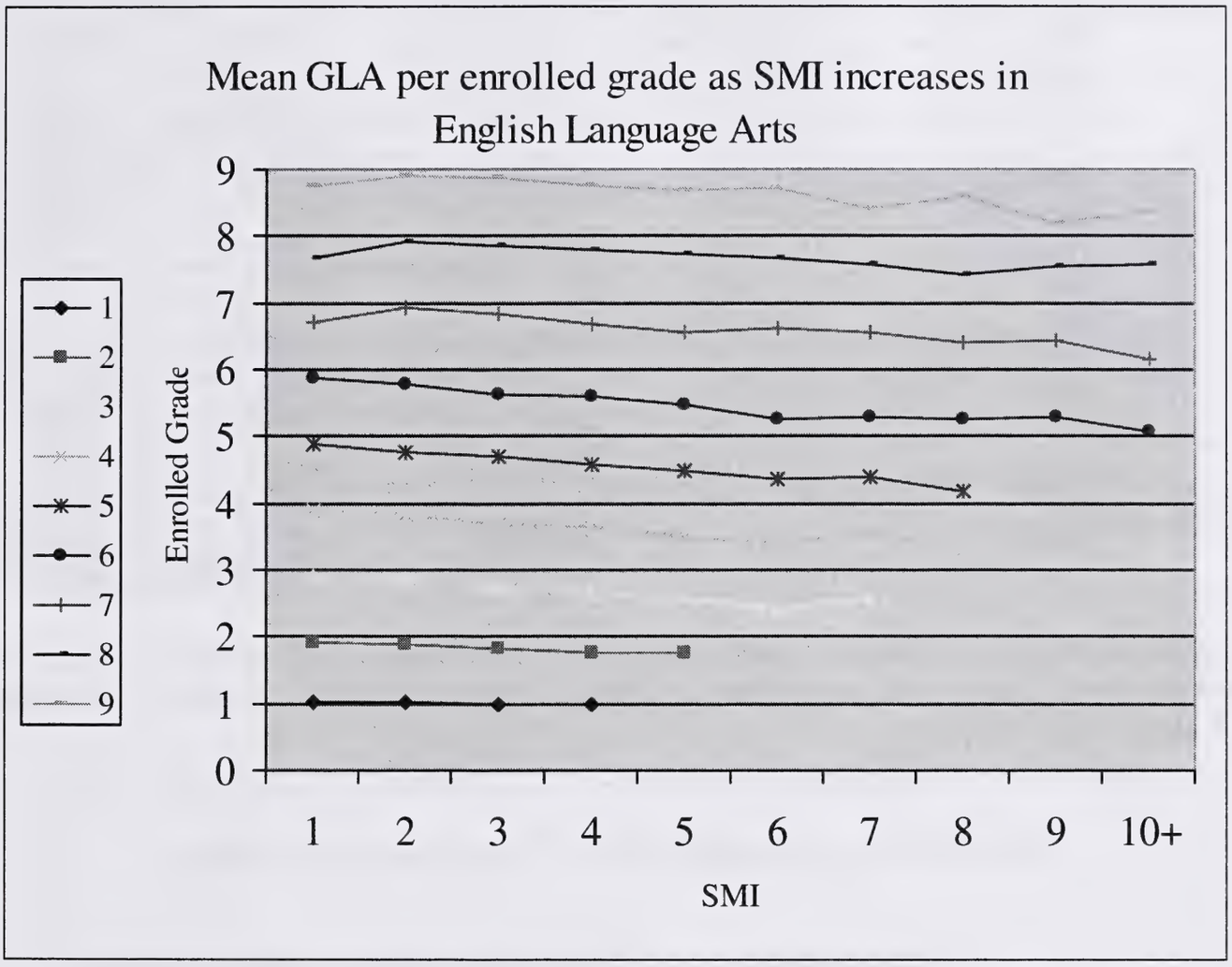
Students' GLA levels compared to Mobility Indicators in English Language Arts				
Mobility Indicator	**GLA Equal or Above**	**GLA Below**	**No GLA Provided**	**Count**
1	30,594 (87.8%)	2,919 (8.4%)	1,322 (3.8%)	34,835
2	20,749 (89.0%)	2,174 (9.3%)	397 (1.7%)	23,320
3	9,543 (84.3%)	1,457 (13.0%)	206 (1.8%)	11,206
4	4,357 (80.8%)	941 (17.5%)	91 (1.7%)	5,389
5	2,254 (78.3%)	562 (19.5%)	61 (2.1%)	2,877
6	1,212 (75.3%)	367 (22.8%)	30 (1.9%)	1,609
7	612 (71.3%)	226 (26.3%)	20 (2.3%)	858
8	341 (73.7%)	111 (24.0%)	11 (2.4%)	463
9	178 (66.2%)	82 (30.5%)	9 (3.3%)	269
10 –16	205 (66.8%)	87 (28.3%)	15 (4.9%)	307
Total	**70,045**	**8,926**	**2,162**	**81,133**

The following two charts further examine the effect of student mobility on grade level of achievement in English Language Arts. Student Mobility was grouped into two categories – high and low. Having a 'low' SMI would indicate that a student has an SMI of five or less, conversely, a student with an SMI of six or higher would be considered 'high' mobility. The chart below shows the breakdown of GLA by mobility categories for each grade.

Table 27 – Student Mobility and English Language Arts by Enrolled Grade

English Language Arts – Student Mobility					
Enrolled Grade	**Mobility**	**GLA Equal or Above**	**GLA Below**	**No GLA Provided**	**Total**
1	High	4 (57.1%)	3(42.9%)	0(0.0%)	7(100%)
	Low	7,068 (80.0%)	950 (10.8%)	810(9.2%)	8,828(100%)
2	High	13 (43.3%)	17 (56.7%)	0(0.0%)	30(100%)
	Low	7,594 (84.2%)	1,059 (11.7%)	363(4.0%)	9,016(100%)
3	High	63 (57.3%)	45 (40.9%)	2(1.8%)	110(100%)
	Low	7,643 (86.3%)	1,051 (11.9%)	160(1.8%)	8,854(100%)
4	High	131 (66.2%)	63 (31.8%)	4(2.0%)	198(100%)
	Low	7,650 (86.1%)	1,079 (12.1%)	161(1.8%)	8,890(100%)
5	High	192 (64.2%)	104 (34.8%)	3(1.0%)	299(100%)
	Low	7,770 (86.2%)	1,136 (12.6%)	113(1.3%)	9,019(100%)
6	High	263 (62.6%)	149 (35.5%)	8(1.9%)	420(100%)
	Low	7,516 (86.5%)	1,026 (11.8%)	147(1.7%)	8,689(100%)
7	High	536 (76.5%)	147 (21.0%)	18(2.6%)	701(100%)
	Low	7,131 (90.3%)	633 (8.0%)	137(1.7%)	7,901(100%)
8	High	645 (78.5%)	157 (19.1%)	20(2.4%)	822(100%)
	Low	7,531 (92.0%)	581 (7.1%)	75(0.9%)	8,187(100%)
9	High	701 (76.3%)	188 (20.5%)	30(3.3%)	919(100%)
	Low	7,594 (92.1%)	538 (6.5%)	111(1.3%)	8,243(100%)

The next graph shows the mean GLA values for each grade broken down by the student mobility indicator. Aside from the first grade, there is a noticeable decrease in the mean GLA value as SMI increases. The data points shown in the following graph are shown for groups that had 20 or more students in each grade per SMI.



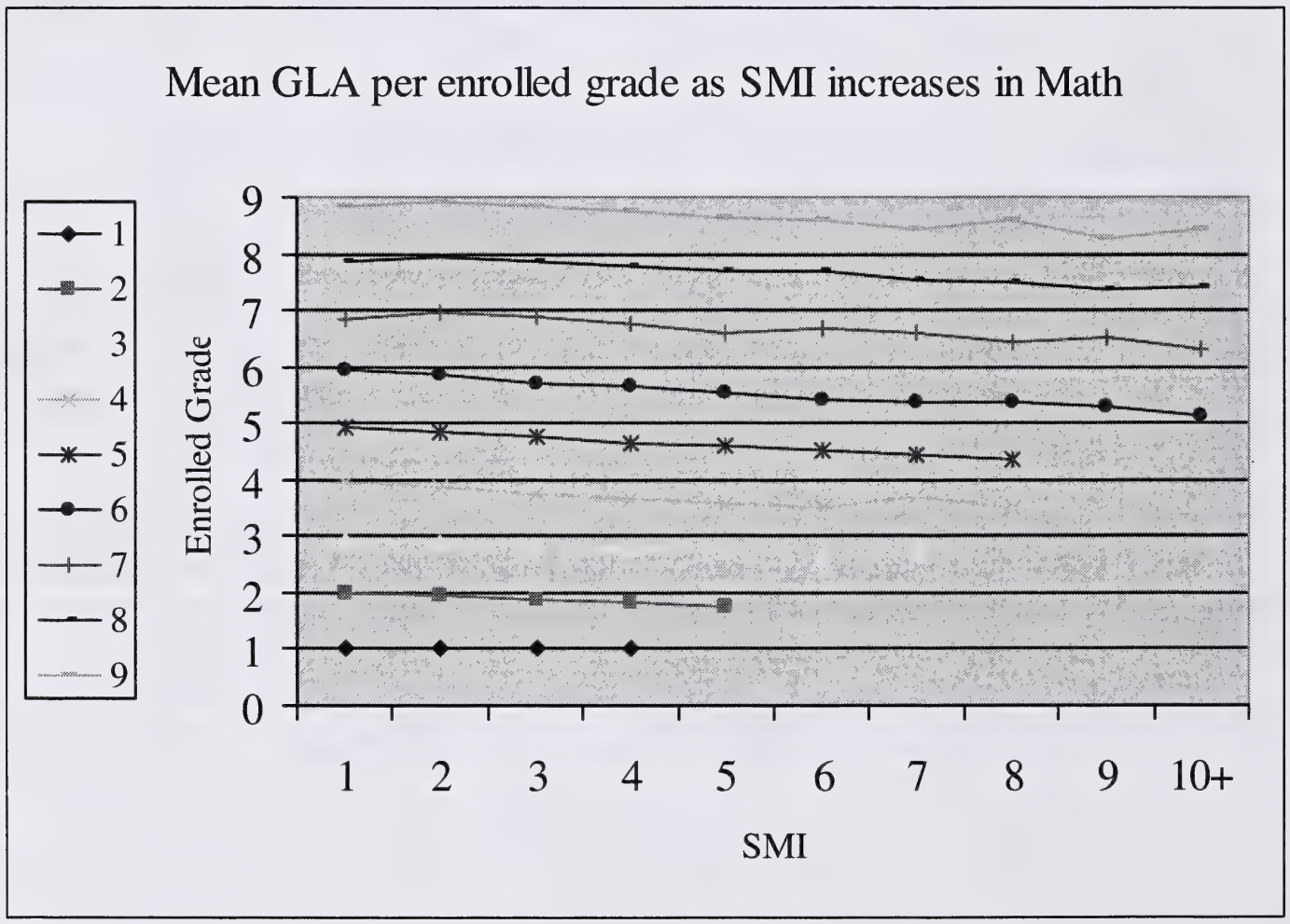
In Grades 1 through 6 the majority of students have an SMI of 1 indicating that these students have not changed schools. In Grades 7 to 9 the majority of students have an SMI of 2 illustrating the usual pattern of moving to a new school for junior high. The two charts on the next page show GLA for math compared to high and low SMI as well as the mean GLA's in each enrolled grade compared to SMI.

The above chart shows a difference of almost one grade between the average GLA of students with an SMI of 1 and those with an SMI of 8 or more, from Grades 4 through 6. This is a further illustration of the negative relationship between the number of school changes a student makes and his/her GLA (as compared to enrolled grade).

Table 28 – Student Mobility and Math by Enrolled Grade

Math- Student Mobility					
Enrolled Grade	**Mobility**	**GLA Equal or Above**	**GLA Below**	**No GLA Provided**	**Total**
1	High	5 (71.4%)	2 (28.6%)	0(0.0%)	7(100%)
	Low	8,090 (91.6%)	520 (5.9%)	218(2.5%)	8,828(100%)
2	High	20 (66.7%)	9 (30.0%)	1(3.3%)	30(100%)
	Low	8,266 (91.7%)	572 (6.2%)	187(2.1%)	9,016(100%)
3	High	77 (70.0%)	31 (28.2%)	2(1.8%)	110(100%)
	Low	7,989 (90.2%)	707 (8.0%)	158(1.8%)	8,854(100%)
4	High	138 (69.7%)	55 (27.8%)	5(2.5%)	198(100%)
	Low	7,942 (89.3%)	772 (8.7%)	176(2.0%)	8,890(100%)
5	High	207 (69.2%)	89 (29.8%)	3(1.0%)	299(100%)
	Low	7,991 (88.6%)	883 (9.8%)	145(1.6%)	9,019(100%)
6	High	291 (69.3%)	123 (29.3%)	6(1.4%)	420(100%)
	Low	7,722 (88.9%)	785 (9.0%)	182(2.1%)	8,689(100%)
7	High	514 (73.3%)	162 (23.1%)	25(3.6%)	701(100%)
	Low	6,862 (86.8%)	583 (7.4%)	456(5.8%)	7,901(100%)
8	High	601 (73.1%)	173 (21.0%)	48(5.8%)	822(100%)
	Low	7,094 (86.6%)	562 (6.9%)	531(6.5%)	8,187(100%)
9	High	639 (69.5%)	220 (23.9%)	60(6.5%)	919(100%)
	Low	7,027 (85.2%)	662 (8.0%)	554(6.7%)	8,243(100%)

The mean GLA values for Math in each grade were plotted against SMI values to produce the following chart. Once again, aside from the first grade there is a gradual decrease in the mean GLA as the SMI increases.



Correlations between SMI and GLA

Kendall's tau-b values were calculated in order to illustrate the relationship between PAT and GLA groupings. Kendall's tau-b is an alternative non-parametric form of rank correlations. The tau-b is used as an inferential statistic to show the strength of those relationships. Tau-b is used to measure the association between student mobility and GLA. This particular test was chosen as it uses ordinal level data based on pair by pair comparisons. The chart below details the correlations.

Table 29 – SMI by GLA, Tau-b Calculations

SMI by GLA- Grade and Subject	*Tau-b*
Eng. LA	0.096*
Math	0.126*

* correlation is significant at the 0.01 level.

The above correlations between student mobility and GLA are significant at the 0.01 level. They are relatively weak in strength, although this is to be expected as student mobility can affect a student's GLA but is not the sole determining variable.

As expected, the percentage of students attaining a GLA equal or above their enrolled grade decreases as the student mobility indicator increases. Inversely, the percentage of students being below their grade level increases as the student mobility indicator increases.

GLA at a glance

The following table shows all groups of students and their GLA in Mathematics and English Language Arts.

Table 30- GLA Overall Summary Table, Including 'No GLA Provided'

Overall Summary Table		Mathematics			English Language Arts		
Student Codes	**Frequency**	**% At or Above**	**% Below**	**% No GLA**	**% At or Above**	**% Below**	**% No GLA**
Provincial Sample	81,430	87.87	8.71	3.41	86.12	11.20	2.68
Non coded	66,627	93.12	4.23	2.65	92.16	5.59	2.24
Severe Disability	2,019	51.70	41.70	6.59	49.88	44.63	5.50
- Emotional/Behavioural Disability	1,255	54.90	40.32	4.78	54.18	41.91	3.90
- Multiple Disability	49	20.41	59.18	20.41	14.29	63.27	22.45
- Physical or Medical Disability	608	47.53	44.24	8.22	45.39	47.86	6.74
- Deafness	77	53.25	35.06	11.69	37.66	54.55	7.79
- Blindness	23	65.22	26.09	8.70	65.22	26.09	8.70
Mild/Moderate Disability	5,721	43.87	51.39	4.74	35.08	60.78	4.14
- Mild Cognitive Disability	1,675	15.70	81.49	2.81	11.94	85.25	2.81
- Moderate Cognitive Disability	50	18.00	80.00	2.00	14.00	82.00	4.00
- Emotional/Behavioural Disability	464	66.38	25.65	7.97	68.53	25.00	6.47
- Learning Disability	2,463	52.62	42.96	4.43	39.46	57.00	3.53
- Hearing Disability	35	85.71	14.29	0.00	85.71	14.29	0.00
- Visual Disability	5	80.00	20.00	0.00	60.00	40.00	0.00
- Communication Disability	554	62.45	30.87	6.68	42.78	50.36	6.86
- Physical/Medical Disability	261	59.77	36.40	3.83	60.15	36.78	3.07
- Multiple Disability	212	45.75	40.57	13.68	39.15	49.53	11.32
Provincial Sample	81,430	87.87	8.71	3.41	86.12	11.20	2.68
Gifted/Talented	2,166	86.06	0.23	13.71	98.89	0.60	0.51
ESL Cdn-Born	2,780	76.51	15.40	8.09	68.67	23.35	7.99
ESL Foreign-Born	2,808	78.84	14.60	6.55	66.92	26.92	6.16
Self-Identified as Aboriginal	4,407	75.01	22.65	2.34	70.7	27.03	2.27
Gender							
- Males	41,716	87.07	9.60	3.33	83.91	13.48	2.62
- Females	39,714	88.73	7.78	3.49	88.45	8.81	2.74
Student Mobility							
- High	3,506	71.08	24.64	4.28	72.67	24.90	2.42
- Low	77,629	88.86	7.78	3.36	86.95	10.37	2.68
Birth Month							
- March to Sept	49,127	88.30	8.30	3.40	86.70	10.70	2.70
- Oct to Feb	32,292	87.20	9.30	3.50	85.40	12.00	2.70

Note: The categories of 'at grade level' and 'above grade level' have been combined. There are not enough cases in the 'above grade level' category to be shown separately.

Significance of GLA

The following table shows the significance of each group in relation to the provincial sample. The table has had the 'no GLA' category removed and the frequencies and percentages have been adjusted to reflect this removal. Each group of students has been compared to the provincial sample to determine whether or not there is a significant difference between the provincial totals and each group. Significance tests were done using the larger groups of students, for example, severe disabilities as a group and not done using the types of severe disabilities. Each group tested demonstrated a significant difference when compared to the provincial sample thus giving some indication of the degree of variability by sub-group. The table is shown on the following page.

Table 31- GLA Overall Summary Table, Excluding 'No GLA Provided'

Overall Summary Table	Mathematics			English Language Arts		
Student Codes	**Frequency**	**% At or Above**	**% Below**	**Frequency**	**% At or Above**	**% Below**
Provincial Sample	78,654	91.0%	9.0%	79,249	88.5%	11.5%
Non coded	64,860	95.7%*	4.3%*	65,133	94.3%*	5.7%*
Severe Disability	1,886	55.4%*	44.6%*	1,908	52.8%*	47.2%*
- Emotional/Behavioural Disability	1,195	57.7%	42.3%	1,206	56.4%	43.6%
- Multiple Disability	39	25.6%	74.4%	38	18.4%	81.6%
- Physical or Medical Disability	558	51.8%	48.2%	567	48.7%	51.3%
- Deafness	68	60.3%	39.7%	71	40.8%	59.2%
- Blindness	21	71.4%	28.6%	21	71.4%	28.6%
Mild/Moderate Disability	5,450	46.1%*	53.9%**	5,484	36.6%*	63.4%*
- Mild Cognitive Disability	1,628	16.2%	83.8%	1,628	12.3%	87.7%
- Moderate Cognitive Disability	49	18.4%	81.6%	48	14.6%	85.4%
- Emotional/Behavioural Disability	427	72.1%	27.9%	434	73.3%	26.7%
- Learning Disability	2,354	55.1%	44.9%	2,376	40.9%	59.1%
- Hearing Disability	35	85.7%	14.3%	35	85.7%	14.3%
- Visual Disability	5	80.0%	20.0%	5	60.0%	40.0%
- Communication Disability	517	66.9%	33.1%	516	452.9%	54.1%
- Physical/Medical Disability	251	62.2%	37.8%	253	62.1%	37.9%
- Multiple Disability	183	53.0%	47.0%	188	44.1%	55.9%
Provincial Sample	78,654	91.0%	9.0%	79,249	88.5%	11.5%
Gifted/Talented	1,869	99.7%*	0.3%*	2,155	99.4%*	0.6%*
ESL Cdn-Born	2,555	83.2%*	16.8%*	2,558	74.6%*	25.4%*
ESL Foreign-Born	2,624	84.4%*	15.6%*	2,635	71.3%*	28.7%*
Self-Identified as Aboriginal	4,304	76.8%*	23.2%*	4,307	72.3%*	27.7%*
Gender						
- Males	40,327	90.1%*	9.9%*	40,625	86.2%*	13.8%*
- Females	38,327	91.9%*	8.1%*	38,624	90.9%*	9.1%*
Student Mobility						
- High	3,356	74.3%*	25.7%*	3,421	74.5%*	25.5%*
- Low	75,021	92.0%*	8.0%*	75,552	89.3%*	10.7%*
Birth Month						
- March to Sept	47,468	91.4%	8.6%	47,807	89.0%	11.0%
- Oct to Feb	31,175	90.3%*	9.7%*	31,431	87.7%*	12.3%*

Note: The categories of 'at grade level' and 'above grade level' have been combined. There are not enough cases in the 'above grade level' category to be shown separately.

Note: Significance tests were not done with the types of disabilities due to the small number in each of those categories.

* Denotes a significant difference when compared to the provincial sample at $p<0.001$.

Individualized Program Plan (IPP)

There were 960 IPP students in this study. These IPP students are not on a graded curriculum and therefore cannot be given a GLA categorization. The students were assessed based on the degree of achievement relative to their foundational skills, academic readiness skills and life skills.

Table 32- IPP Foundation Skills

Foundation Skills

	Number of Students	Percent of Total Enrolled (%)
All skills attained	151	15.73
Most skills attained	280	29.17
Some skills attained	267	27.81
None of the skills attained	251	26.15
N/A	11	1.15
Total	**960**	**100.00**

Table 33 – IPP Academic Readiness Skills

Academic Readiness Skills

	Number of Students	Percent of Total Enrolled (%)
All skills attained	110	11.46
Most skills attained	230	23.96
Some skills attained	286	29.79
None of the skills attained	204	21.25
N/A	130	13.54
Total	**960**	**100.00**

Table 34 – IPP Life Skills

Life Skills

	Number of Students	Percent of Total Enrolled (%)
All skills attained	169	17.60
Most skills attained	243	25.31
Some skills attained	225	23.44
None of the skills attained	191	19.90
N/A	132	13.75
Total	**960**	**100.00**

GLA and Enrolled Grade by Sub-Groups of the Population

Correlations

Correlations between the students' GLAs and enrolled grades were calculated using Spearman's rho to determine the "goodness of fit" between GLA and enrolled grade related to students' being "coded" or not. The correlation between the two variables reflects the degree to which they "move" together. In this case, a high positive correlation coefficient results when an increase in enrolled grade is mirrored by the same increase in grade level of achievement. As was expected, GLA was highly correlated to enrolled grade, meaning the enrolled grade of a student typically matches their GLA. In English Language Arts this relationship was strongest for the gifted and talented students, while students with mild/moderate disabilities had the lowest correlation between GLA and enrolled grade. In Math, the relationship was strongest for the non-coded students while students with mild/moderate disabilities had the lowest correlation. The data used in these analyses resulted in similar results obtained when this analysis was conducted with 2003/04 GLA data. (The exception is that in 2003/04, ELA's strongest correlation was in terms of non-coded students)

Table 35 – Correlations between GLA and Enrolled Grade, ELA

English GLA	
Student Codes	***Correlation Coefficient***
Non-Coded	.991**
Severe Disabilities	.853**
Mild/Moderate Disabilities	.845**
Gifted and Talented	.994**
ESL Canadian Born (303)	.974**
ESL Foreign Born (301)	.925**

**Correlation is significant at the 0.01 level (2-tailed)

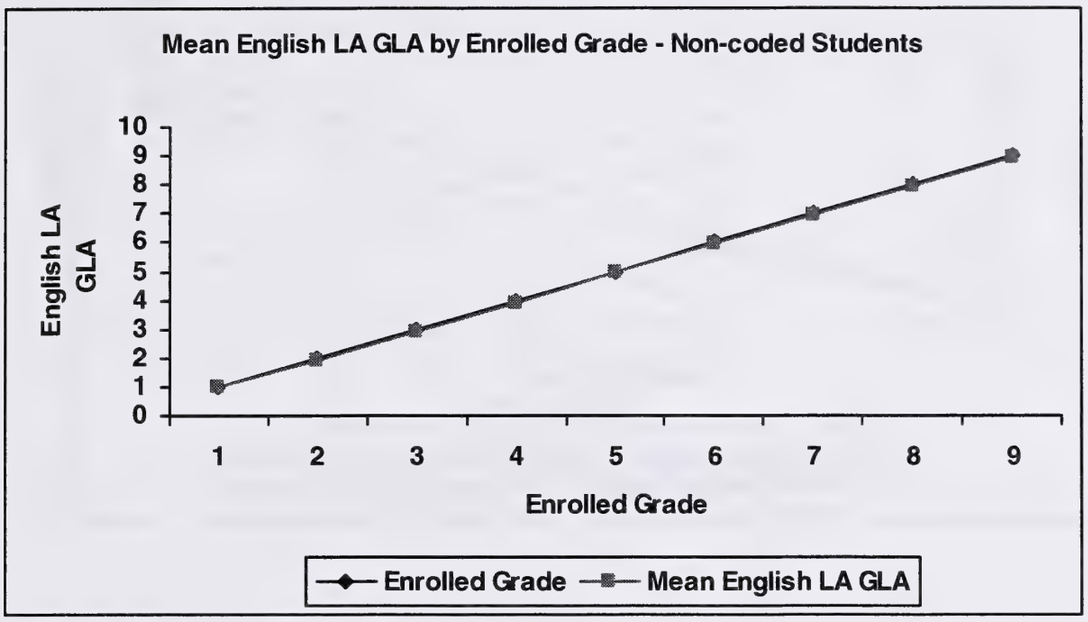
Table 36 – Correlations between GLA and Enrolled Grad, Math

Math GLA	
Student Codes	***Correlation Coefficient***
Non-Coded	.994*
Severe Disabilities	.863**
Mild/Moderate Disabilities	.854**
Gifted and Talented	.980**
ESL Canadian Born (303)	.985**
ESL Foreign Born (301)	.974**

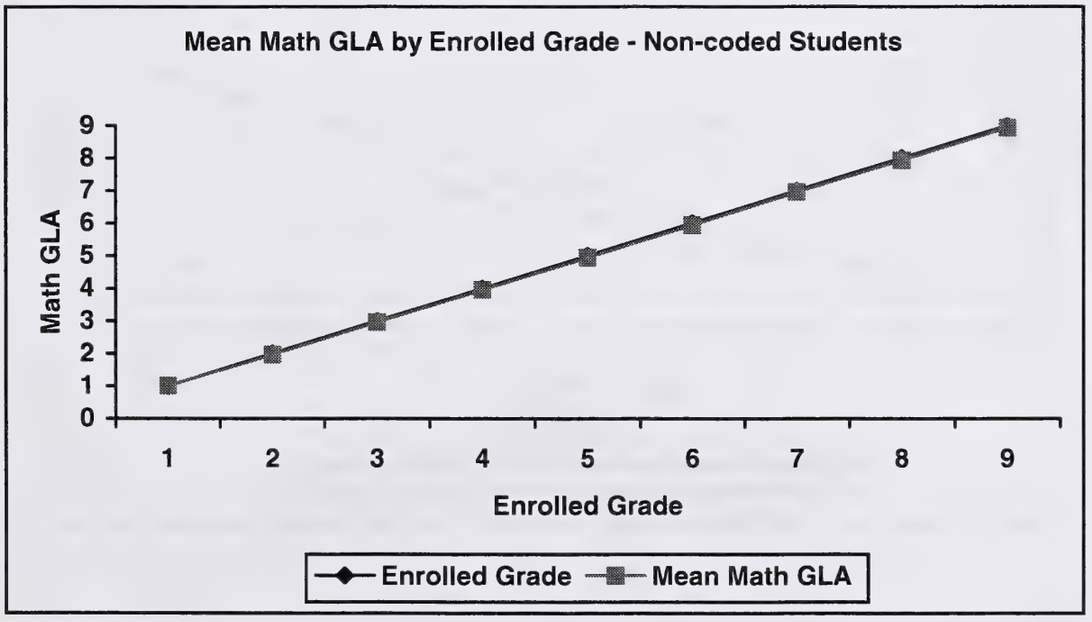
** Correlation is significant at the 0.01 level (2-tailed).

The graphs (next pages) show GLA by enrolled grade for all students as well as sub-populations of students, in English Language Arts and Math. The mean GLA is plotted against the enrolled grade to show graphically the degree to which students' GLA reflects or departs from their enrolled grade relative to sub-group affiliations.

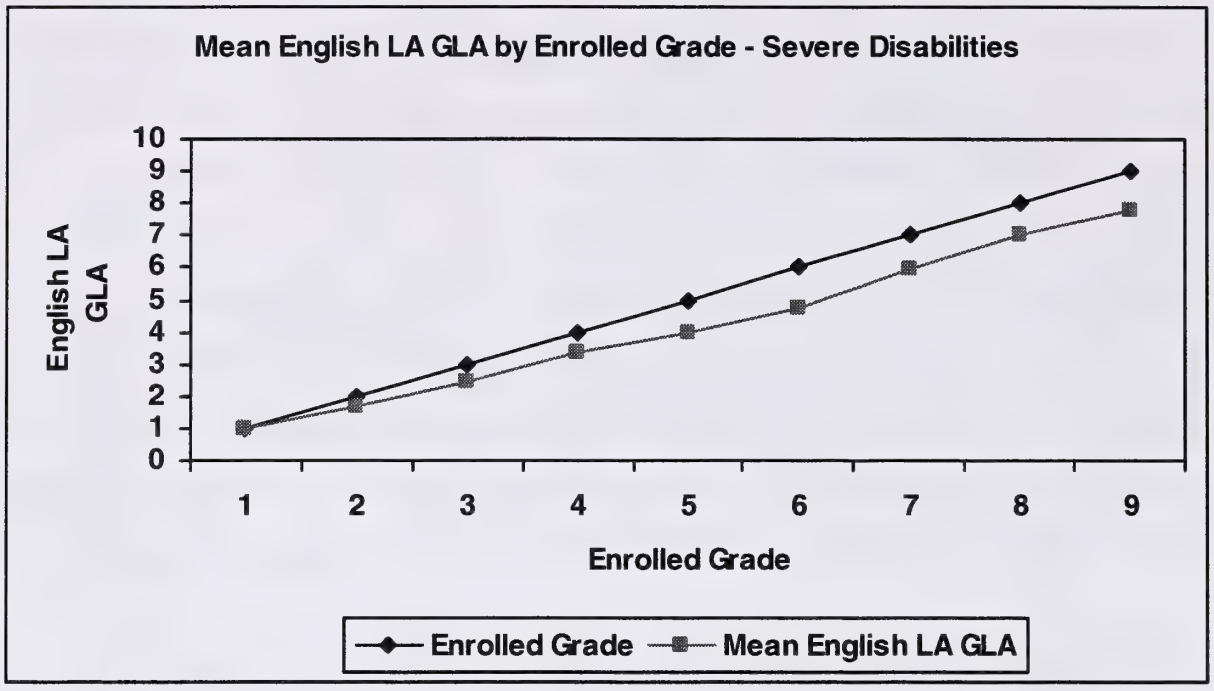
Non-Coded Students



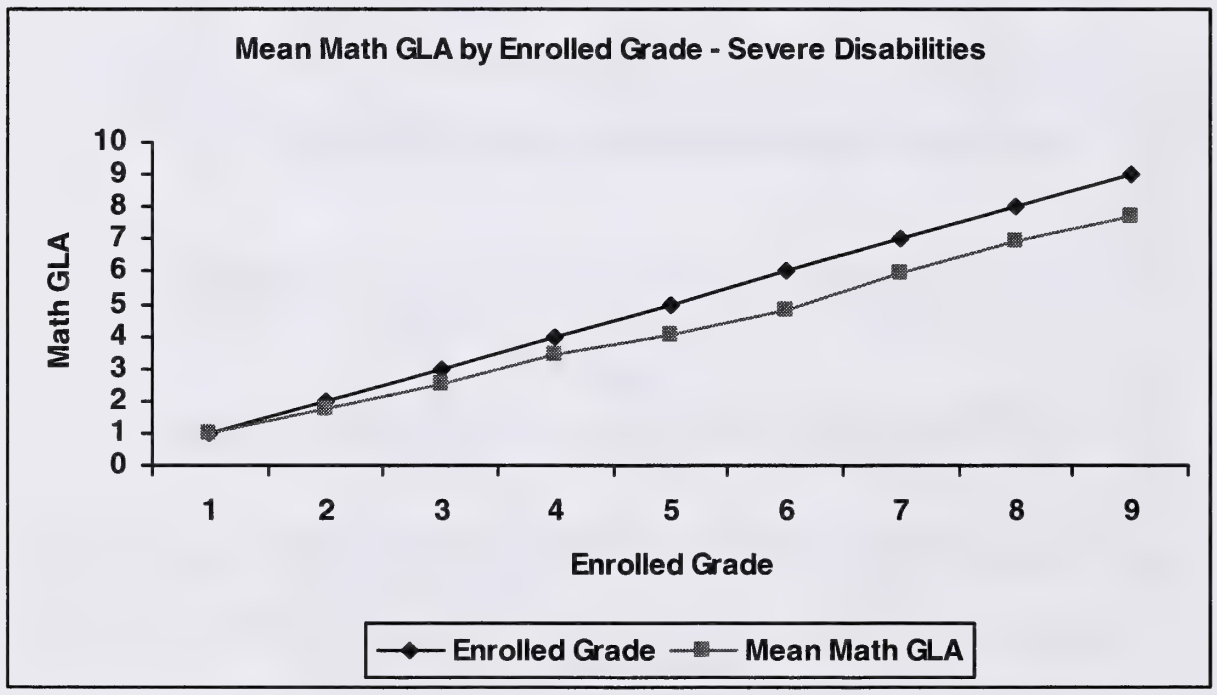
Non-Coded Students



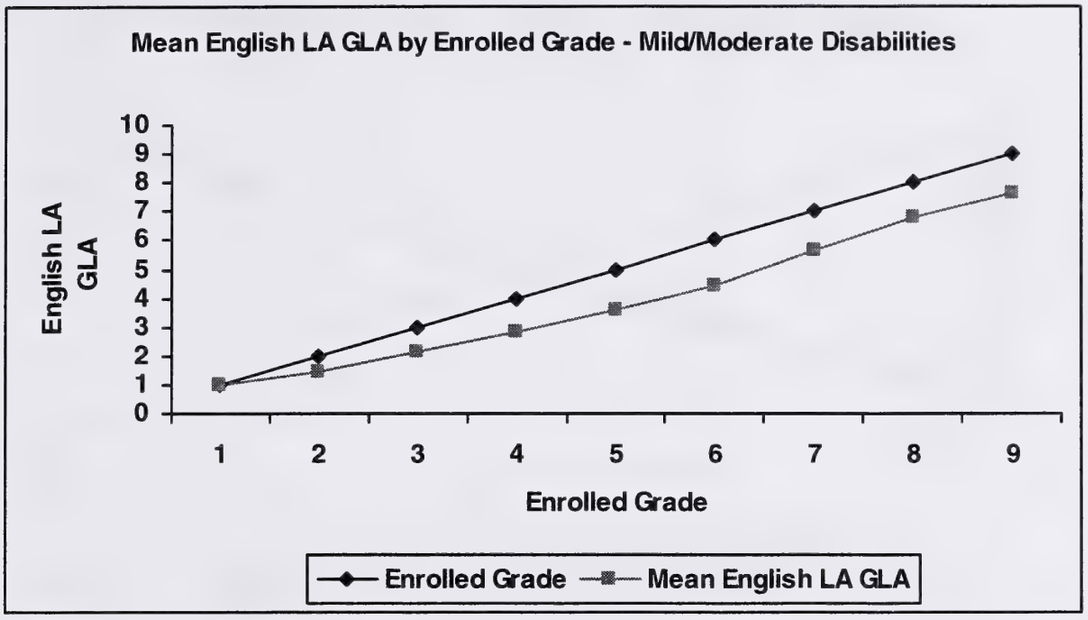
Students with Severe Codes



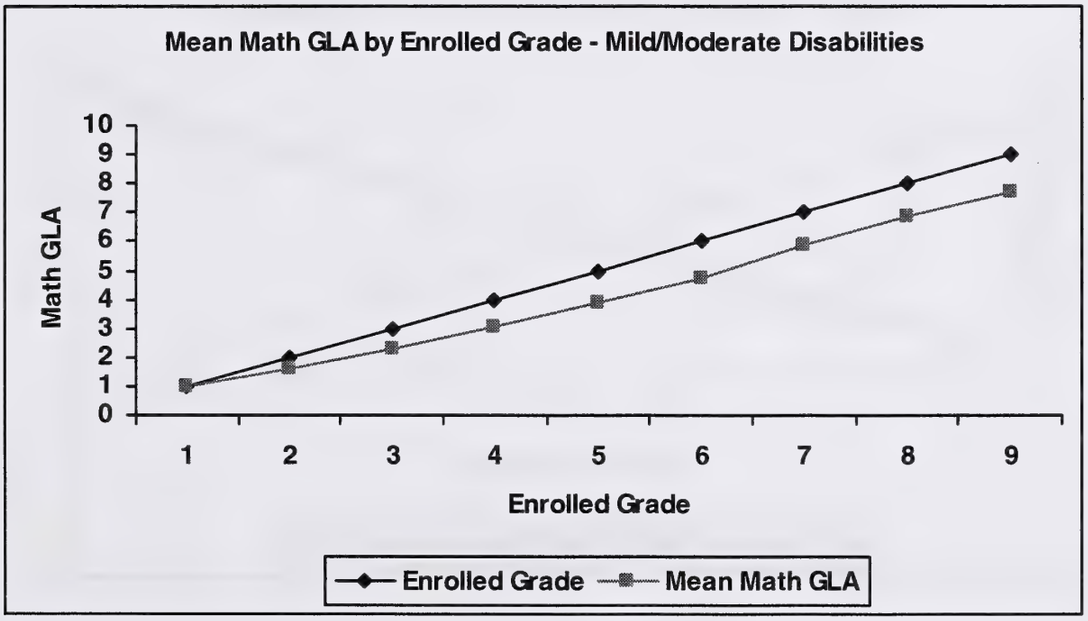
Students with Severe Disabilities



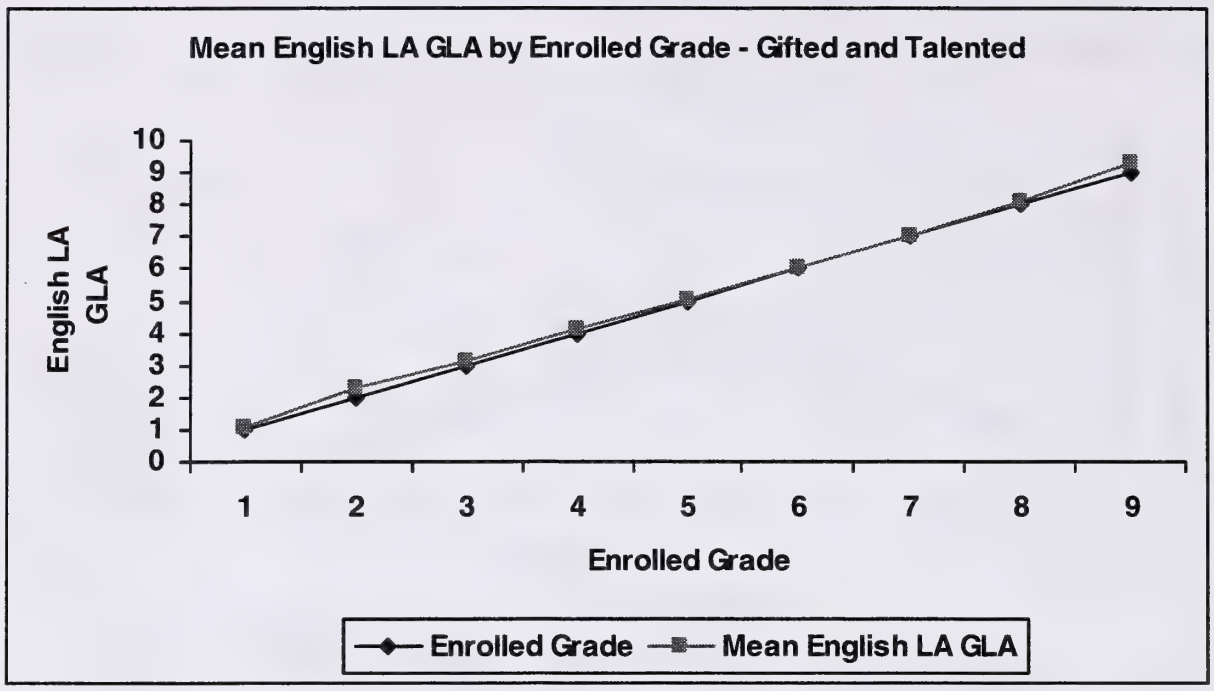
Students with Mild/Moderate Disabilities



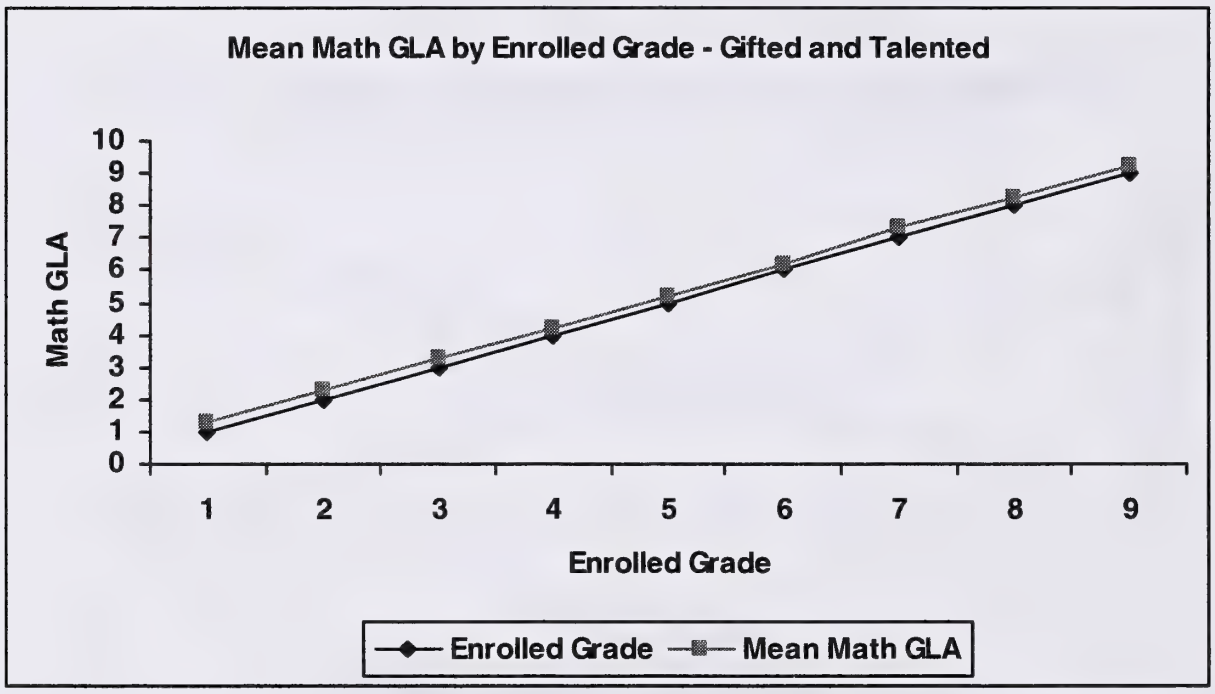
Students with Mild/Moderate Disabilities



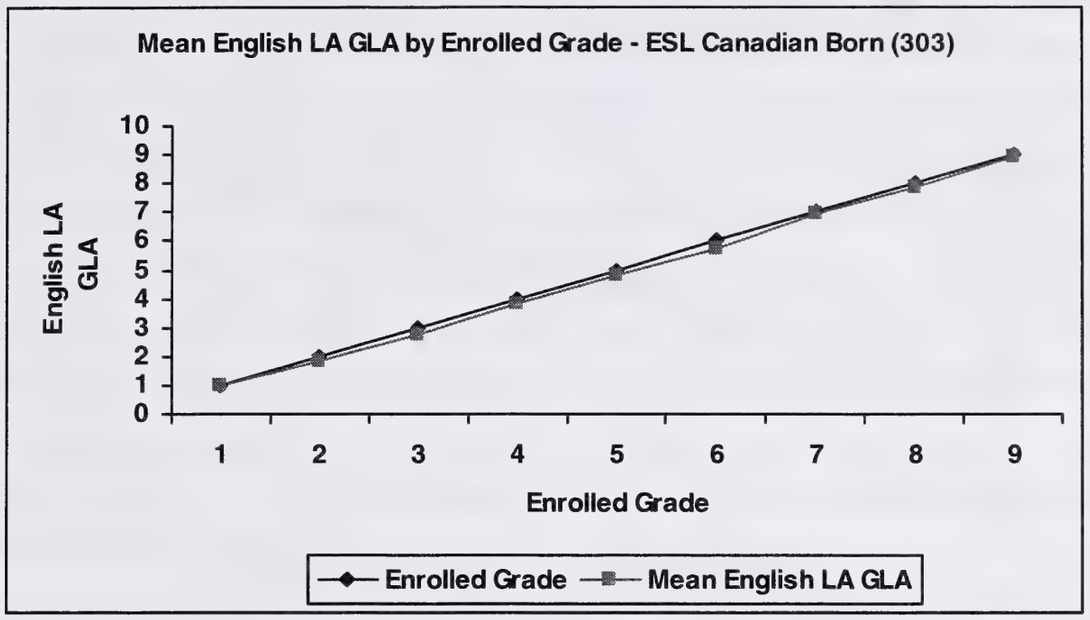
Gifted and Talented Students



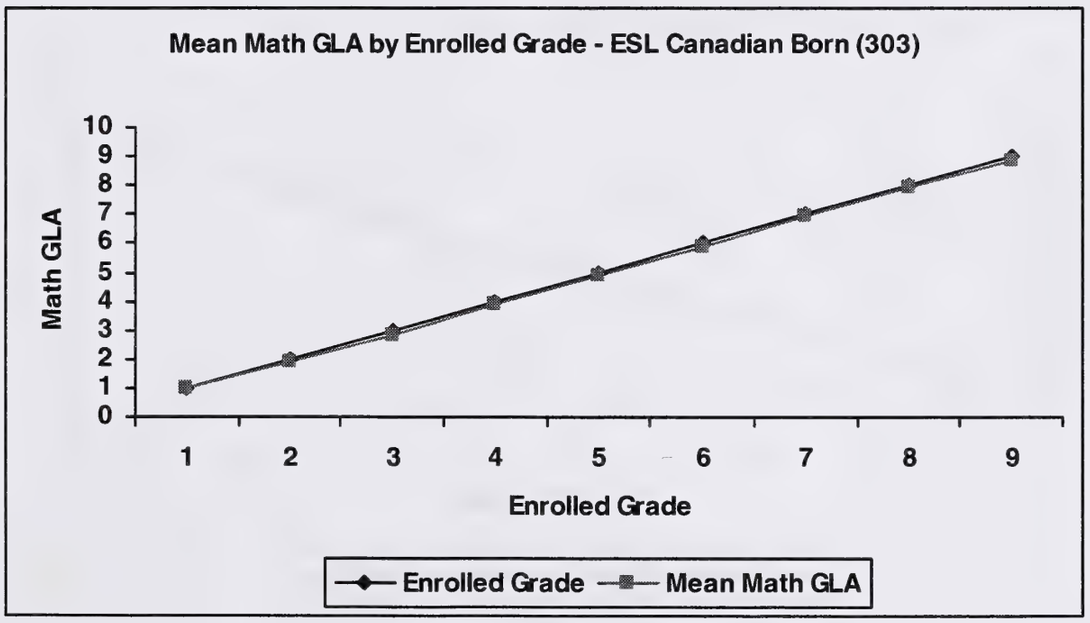
Gifted and Talented Students



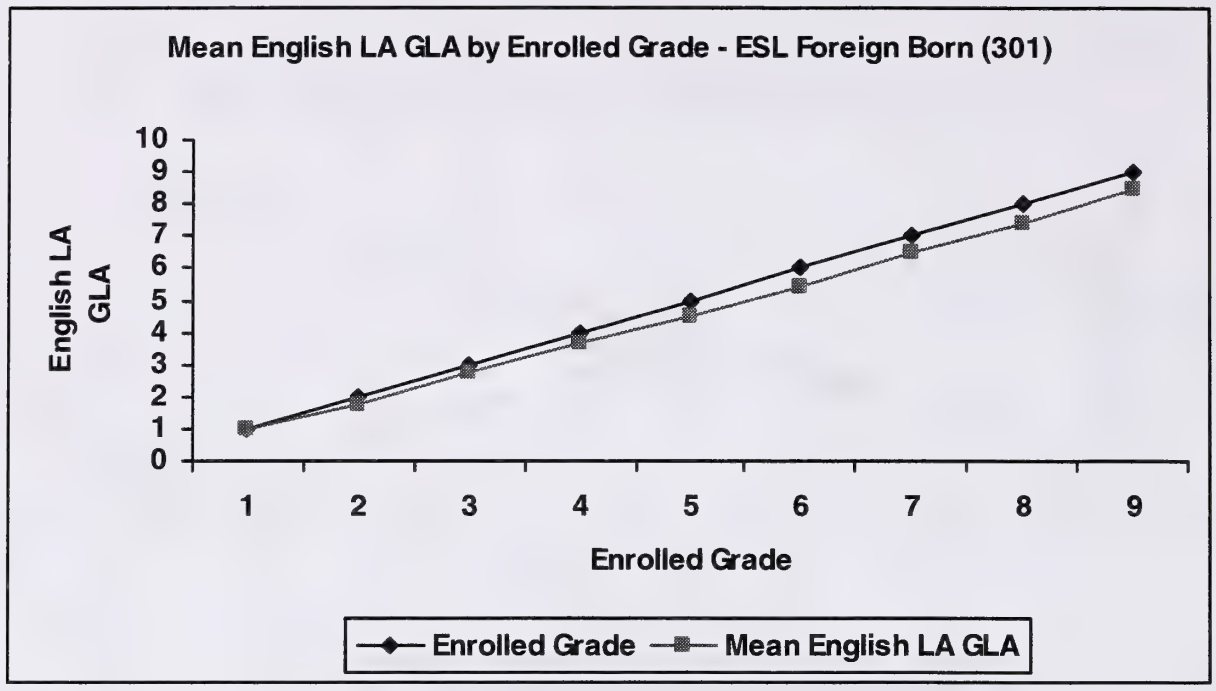
ESL Canadian-Born Students



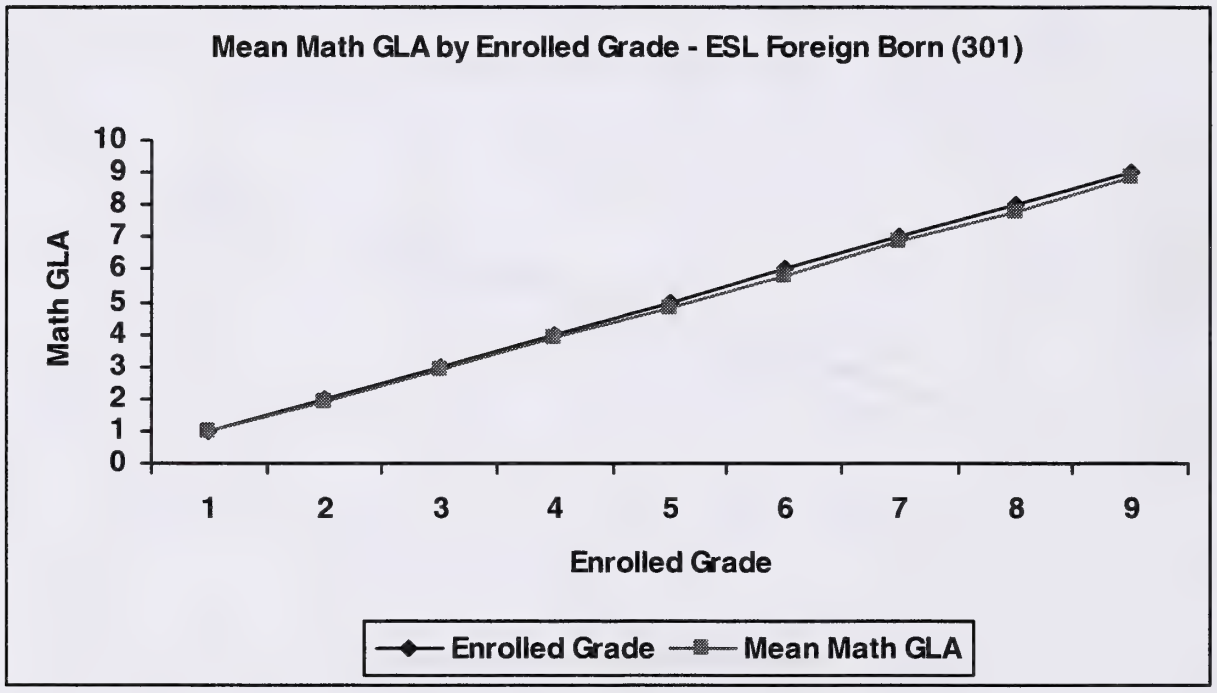
ESL Canadian-Born Students



ESL Foreign-Born Students



ESL Foreign-Born Students



Discussion

These graphs show that there is concurrent validity between the GLA data and the degree of special needs students have. For non-coded students the mean GLA in each grade matches the enrolled grade almost perfectly, and this is as expected. One would hypothesize that non-coded students' grade levels of achievement should match very precisely the grade they are enrolled in, and this is what the data show as the mean GLAs range from 0.08 decimal places below the enrolled grades to 0.01 decimal places above the grade level in Math and English. Likewise, one would hypothesize that students with either mild moderate or severe codes mean GLAs would not as precisely reflect the enrolled grade, and again this is what the data show. The mean GLAs in Math and English for students with severe codes range from 1.29 to 0.03 below enrolled grade, and mild moderate mean GLAs range from 1.56 to 0.00 below enrolled grade.

From a system perspective, a longer term question will relate to how can special needs programming be adjusted to be more effective in narrowing and potentially eliminating the gap between enrolled grade and GLA.

Comparison of GLA and PAT

The GLA by PAT analysis demonstrates that GLA data can indeed supplement PAT data with reasonable reliability and validity.

Correlations between PAT and GLA

Kendall's tau-b was used to measure the association between PAT and GLA. This particular test was chosen as it uses ordinal level data based on pair by pair comparisons. The chart below details the correlations.

The PAT and GLA variables were re-coded into the dichotomous categories: either 'Below Acceptable', or 'At or Above Acceptable' for PATs; and either 'Below Grade Level' or 'At or Above Grade Level' for GLA, and then the two dichotomous variables were compared. All relationships tested were at the $p < .01$ levels meaning they were significant. The p-value shows that the observed relationships are not due to chance. The following tables show all tau-b values for the relationships tested and from this one can conclude that the relationships are moderate in strength. A perfect relationship of 1.0 between GLA and PAT is neither an expected nor a desirable condition given the inherent differences underlying the evaluation designs which would underlie potentially different learning outcomes being measured with different assessment methods.

Table 37- PAT by GLA Tau-b Calculations

2003-04		2005-06	
PAT by GLA- Grade and Subject	***Tau-b***	***PAT by GLA- Grade and Subject***	***Tau-b***
Gr. 3 Eng. LA	.392	Gr. 3 Eng. LA	.378
Gr. 6 Eng. LA	.337	Gr. 6 Eng. LA	.406
Gr. 9 Eng. LA	.293	Gr. 9 Eng. LA	.338
Gr. 3 Math	.326	Gr. 3 Math	.388
Gr. 6 Math	.298	Gr. 6 Math	.403
Gr. 9 Math	.303	Gr. 9 Math	.399

GLA by PAT Analysis-Comparisons Using Achievement Levels

In order to further examine the relationship between the GLA data and provincial achievement tests (PATs) and provide an additional perspective on these relationships, both PAT and GLA data were again re-coded into the dichotomous categories of either 'Below Acceptable', or 'At or Above Acceptable' for PATs; and 'Below Grade Level' or 'At or Above Grade Level' for GLA. These were then cross-tabulated with the hypothesis being that students who score at or above the acceptable level tend to be at or above grade level, and likewise those that score below acceptable tend to be below grade level. The following tables show some support for the hypothesis, as 77-80% of the students in Language Arts and 67-81% of the students in Math who are at grade level are also at or above the acceptable level on the PATs. The data in the following tables includes all students from schools that submitted GLA data for 2005-06 in Grades 3, 6 or 9.

Table 38- Comparison of English Language Arts PAT and GLA

Comparison of English Language Arts PAT and GLA

		Grade Level of Achievement – English Language Arts			
		Below Grade Level	*At or Above Grade Level*	*No GLA Provided*	*Total*
PAT - Grade 3 English Language Arts	Below Accept. /Excused/Absent	7.74% (693)	7.73% (692)	0.60% (54)	16.07% (1,439)
	Accept. or Excellent	4.42% (396)	78.33% (7,014)	1.17% (105)	83.93% (7,515)
	Total	12.16% (1,089)	86.06% (7,706)	1.77% (159)	100% (8,954)
PAT - Grade 6 English Language Arts	Below Accept. /Excused/Absent	9.36% (853)	8.04% (733)	0.51% (47)	17.90% (1,633)
	Accept. or Excellent	3.55% (324)	77.33% (7,051)	1.10% (110)	82.09% (7,485)
	Total	12.90% (1,177)	85.37% (7,784)	1.72% (157)	100% (9,118)
PAT – Grade 9 English Language Arts	Below Accept. /Excused/Absent	6.57% (598)	10.28% (936)	0.89% (81)	17.74% (1,615)
	Accept. or Excellent	1.34% (122)	80.42% (7,322)	0.49% (45)	81.77% (7,444)
	Total	7.91% (720)	90.71% (8,258)	1.38% (126)	100% (9,104)

Note: All of the above observed relationships were significant when measured by Chi square.

Table 39- Comparison of Mathematics PAT and GLA

Comparison of Mathematics PAT and GLA					
		Grade Level of Achievement – Mathematics			
		Below Grade Level	*At or Above Grade Level*	*No GLA Provided*	*Total*
PAT - Grade 3 Math	Below Accept. /Excused/Absent	6.07% (543)	8.82% (790)	0.57% (51)	15.46% (1,384)
	Accept. or Excellent	2.09% (187)	81.27% (7,276)	1.18% (106)	84.54% (7,569)
	Total	8.05% (730)	90.09% (8,066)	1.75% (157)	100% (8,953)
PAT - Grade 6 Math	Below Accept. /Excused/Absent	8.44% (770)	11.38% (1,038)	0.76% (69)	20.59% (1,877)
	Accept. or Excellent	1.53% (140)	76.55% (6,980)	1.33% (121)	78.09% (7,120)
	Total	9.98% (910)	87.93% (8,018)	2.08% (190)	100% (9,118)
PAT – Grade 9 Math	Below Accept. /Excused/Absent	8.85% (805)	16.47% (1,498)	4.71% (428)	30.02% (2,731)
	Accept. or Excellent	0.78% (71)	67.36% (6,127)	1.84% (167)	69.98% (6,365)
	Total	9.63% (876)	83.83% (7,625)	6.54% (595)	100% (9,096)

Note: All of the above observed relationships were significant when measured by Chi square.

It should be noted, in reviewing the above two tables, that many more students are categorized as 'below grade level' in the PAT results than is true in GLA ratings. To illustrate, using the above Mathematics table, the following comparisons can be made:

Table 40- Students below acceptable/excused or absent on the PAT

Test	Total # of Students	# Students At or Above GLA Grade level	Percent of Students At or Above GLA Grade Level
PAT Math 3	1,384	790	57%
PAT Math 6	1,877	1,038	55%
PAT Math 9	2,731	1,498	55%

Table 41- Students below grade level on GLA

Test	Total # of Students	# Students Acceptable or Excellent on PAT	Percent of Students Acceptable or Excellent on PAT
PAT Math 3	730	187	26%
PAT Math 6	910	140	15%
PAT Math 9	876	71	8%

It would appear from the above tables that while more than half of the students who do not attain the acceptable standard on the PAT are considered at or above grade level, only a small percentage of those who are considered below grade level are able to attain the acceptable standard on the PAT. This suggests that in terms of evaluating acceptable progress, the PAT is a more difficult standard to attain than is the GLA. The two assessments are not expected to yield

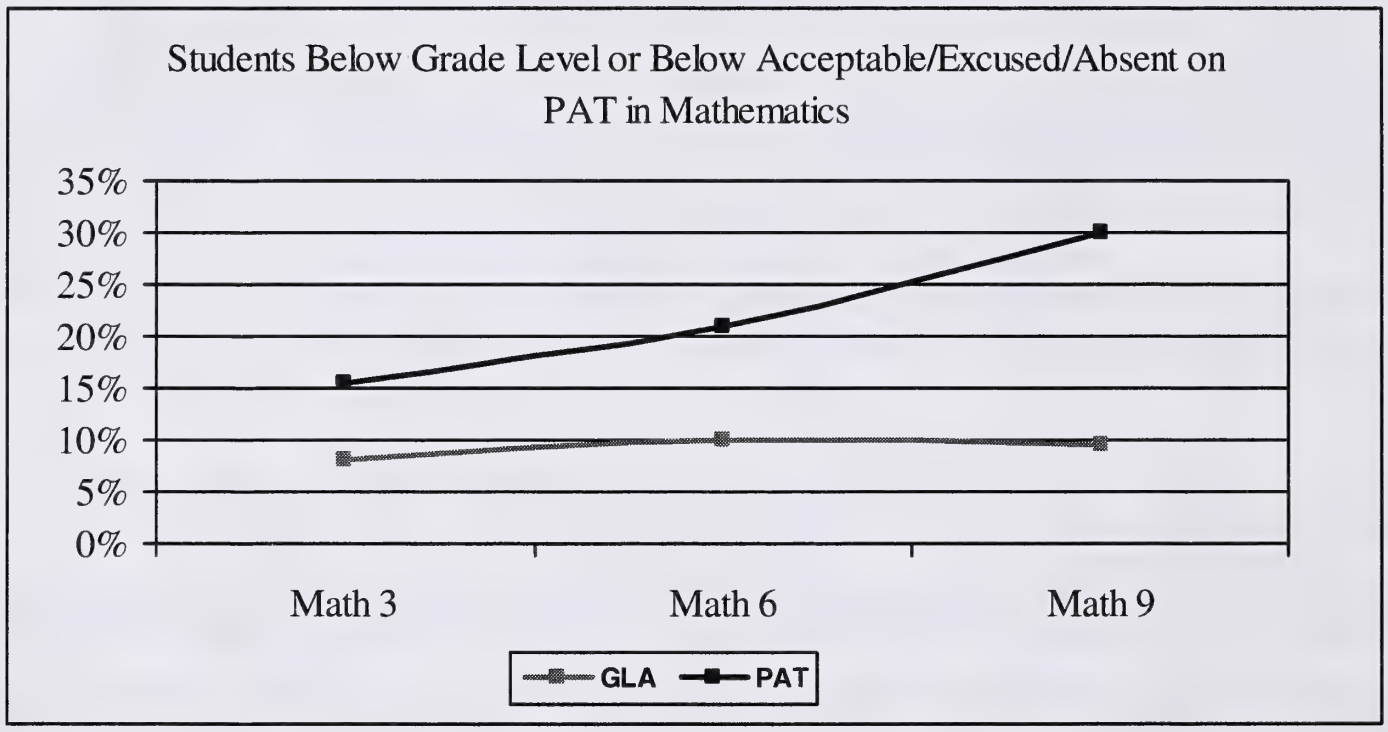
the same results, in that they are different forms of assessment, but both are designed to assess whether a student has met grade level standards. Therefore, one might expect that the variability would be seen as much in one direction as the other. The fact that this is not true suggests several possibilities: 1) that it may be more difficult for teachers to assign a 'below grade level' evaluation to one of their students than is the case for markers of the PAT assessments, 2) student performance on PATs may be attenuated by test anxiety; 3) students may perform better over many assessments over time than on a single paper and pencil test, or 4) a combination of these factors

Analysis of Students Below Grade Level

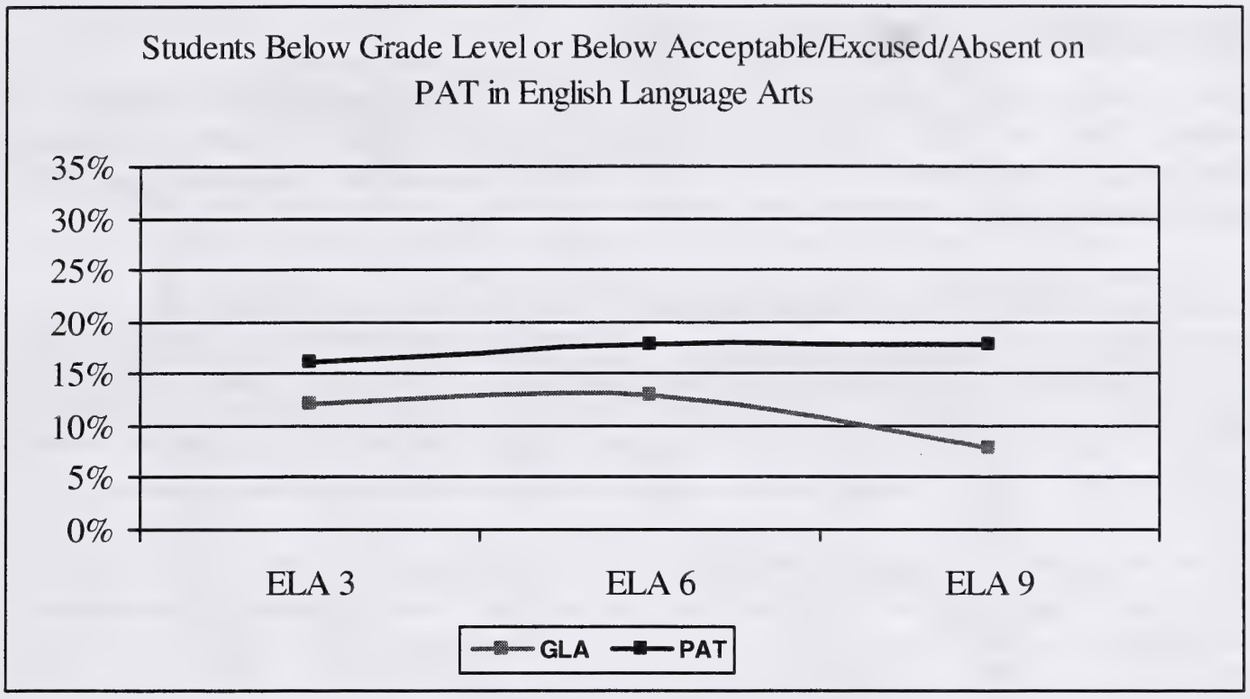
In this section the ratings given by teachers through the GLA are compared to Provincial Achievement Test results in Grades 3, 6 and 9. In each case, it is possible to identify the students who are rated as below grade level by their teachers (GLA) and those rated as below acceptable standard by the PAT.

One would expect some differences in the designation of individuals in the two ratings, since the teachers have an array of assessments available to do the rating potentially measuring a broader range of learning outcomes, whereas the PAT is a single paper and pencil test. However, since the objective of both methods is to measure how well a student is performing as compared to the learning outcomes in the program of studies, one would expect an overall positive relationship between the number of students identified as "below" by both methods.

An examination of the GLA pilot data shows that this assumption departs most dramatically for Math 9.



Note: The data presented in the above tables are discrete data points. The lines were included to emphasize the patterns of the data.



Note: The data presented in the above tables are discrete data points. The lines were included to emphasize the patterns of the data.

Discussion

A primary reason for provincial aggregation of Grade Level of Achievement data is evaluation of education programs such as special education, English as a Second Language, etc. This observation is particularly relevant for those grades that do not have PAT testing where GLA can serve as a proxy for PAT data. Additionally, it is useful to be able to supplement PAT data with GLA data in Grades 3, 6 and 9 as the added advantage would be broader and richer data to inform program evaluation related decisions. An example is the analysis of students below grade level.

Further, the fact that the tau-b values show moderate strength lends credibility to the process of collecting GLA. A perfect relationship of 1.0 between GLA and PAT is not an expected nor a desirable condition given the inherent differences underlying the evaluation designs. PAT data are derived from a single paper and pencil test whereas GLA data are based on numerous and more dynamic observations over time, and thus should be a much richer method of assessment, which one could reasonably assume to produce, positively correlated albeit different data than a PAT result.

Birth Month-Combined Grades

The following table shows students' GLA values for Math and English Language Arts when broken down by birth month. When grade levels are combined there is a relatively equal distribution of students across birth months with students born in March and April slightly outperforming those born in other months.

Table 42- Birth Month by Mathematics and English Language Arts GLA

Student Birth Month			Mathematics			English Language Arts		
Month	Frequency	Percentage	% at or above grade level	% below grade level	% No GLA Provided	% at or above grade level	% below grade level	% No GLA Provided
January	6,663	8.2%	86.9	9.5	3.6	85.2	11.8	3.0
February	6,222	7.6%	87.9	8.6	3.5	86.4	10.9	2.7
March	6,843	8.4%	89.5	7.4	3.1	87.4	9.8	2.8
April	6,947	8.5%	88.8	7.6	3.6	87.9	9.6	2.5
May	7,308	9.0%	88.3	8.4	3.3	86.7	10.5	2.8
June	6,962	8.6%	88.4	8.4	3.2	86.8	10.6	2.6
July	7,070	8.7%	87.8	8.8	3.4	86.4	10.9	2.6
August	6,960	8.5%	88.0	8.5	3.5	85.9	11.4	2.7
September	7,037	8.6%	87.5	9.0	3.6	85.5	11.8	2.7
October	6,670	8.2%	87.2	9.5	3.4	85.5	12.1	2.3
November	6,362	7.8%	87.3	9.4	3.3	84.6	12.8	2.6
December	6,375	7.8%	86.9	9.6	3.5	84.8	12.5	2.7
Total	81,419	100.0%	87.9	8.7	3.4	86.1	11.2	2.7

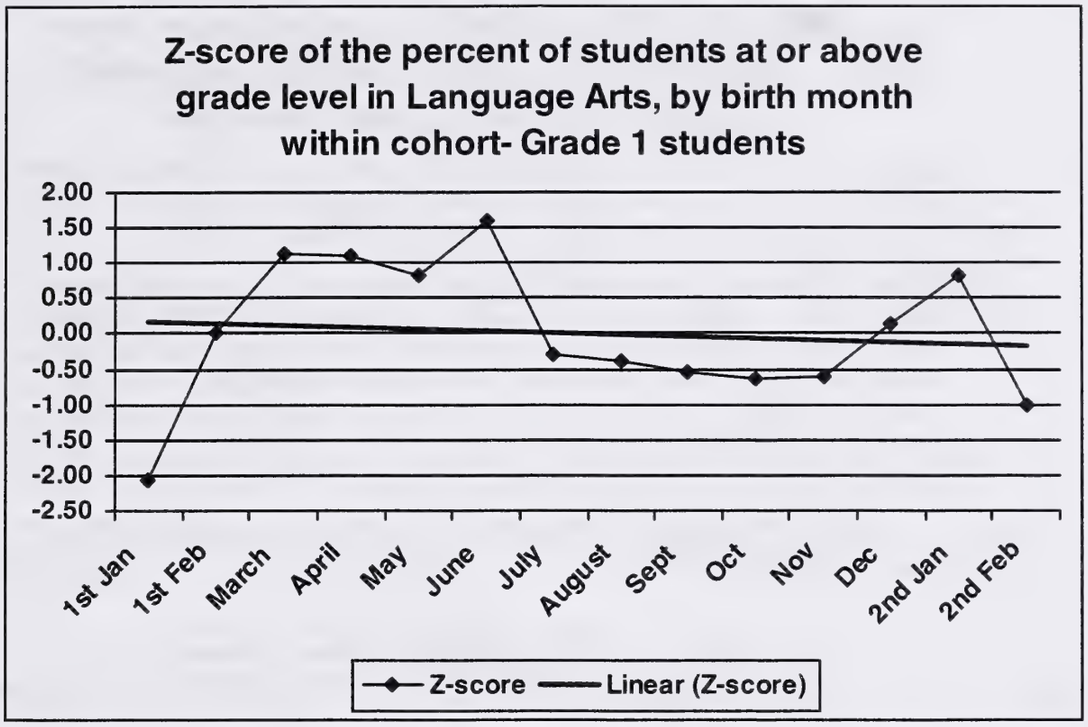
GLA and PAT by Age within Grade Cohorts

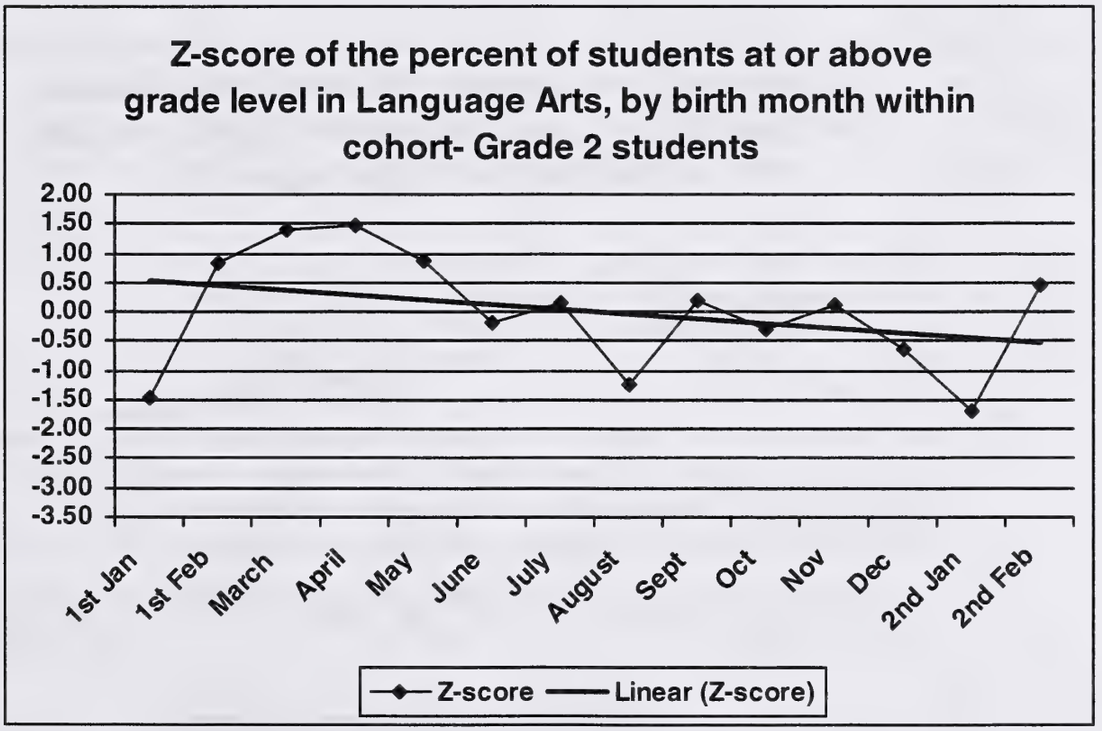
Previous Alberta Education[4] studies have indicated that there is a relative age effect between average PAT scores and birth month within grade cohorts, where older students tend to have higher average test scores than the younger students when measured by the z-score of average PAT results for each birth month group.

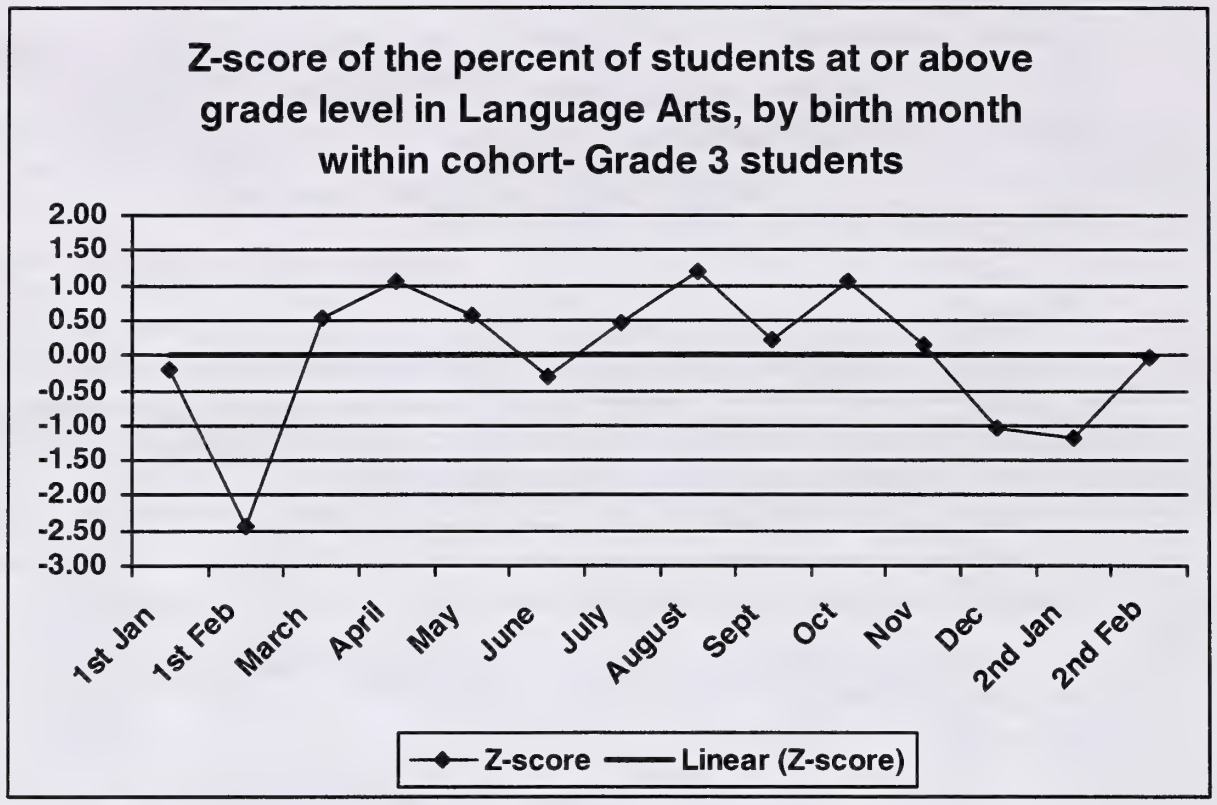
A comparative analysis was undertaken using GLA data. The percentages of students 'at or above' their grade level in English Language Arts and Math were converted to z-scores and plotted. (see graphs below). There is a noticeable age effect, although not statistically significant, in the early grades.

The following graph was produced using the z-score for Grade 1 English Language Arts GLAs for students in the GLA dataset:

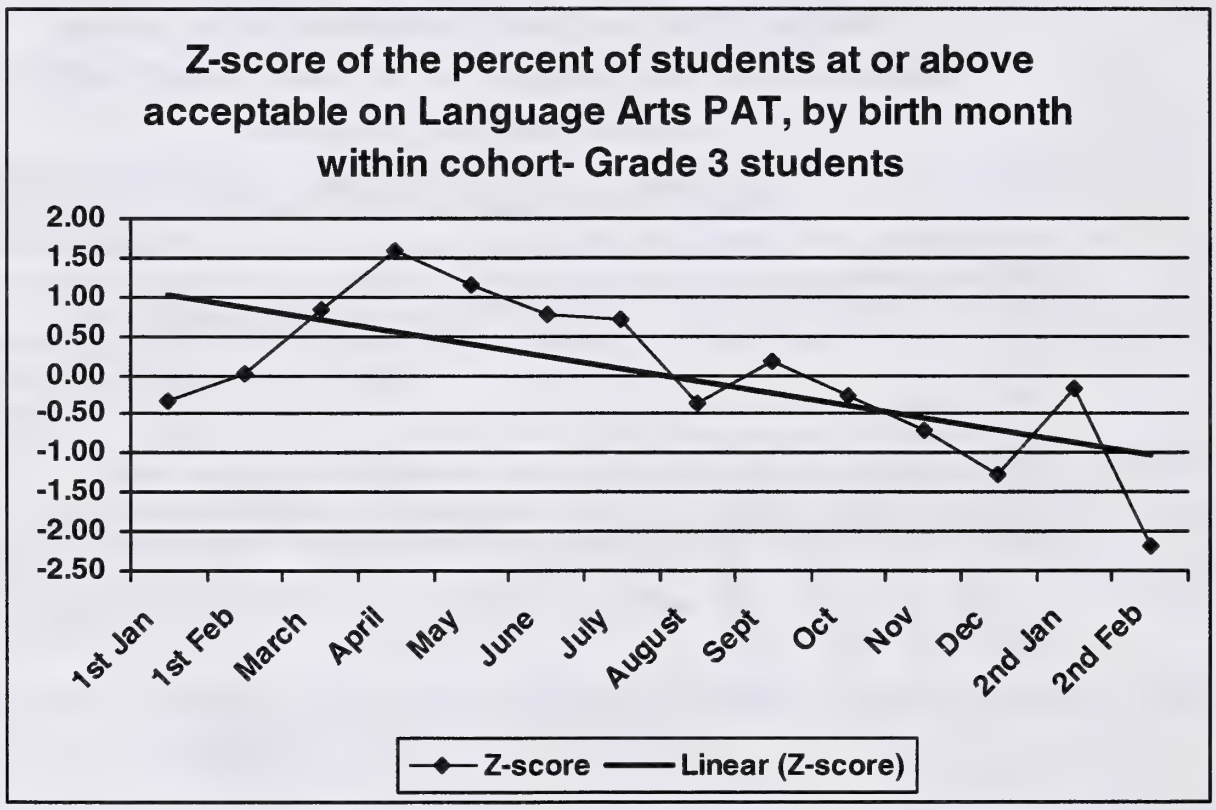
[4] *Entry Age, Age Within Cohort, and Achievement.* Alberta Learning, March 2001.

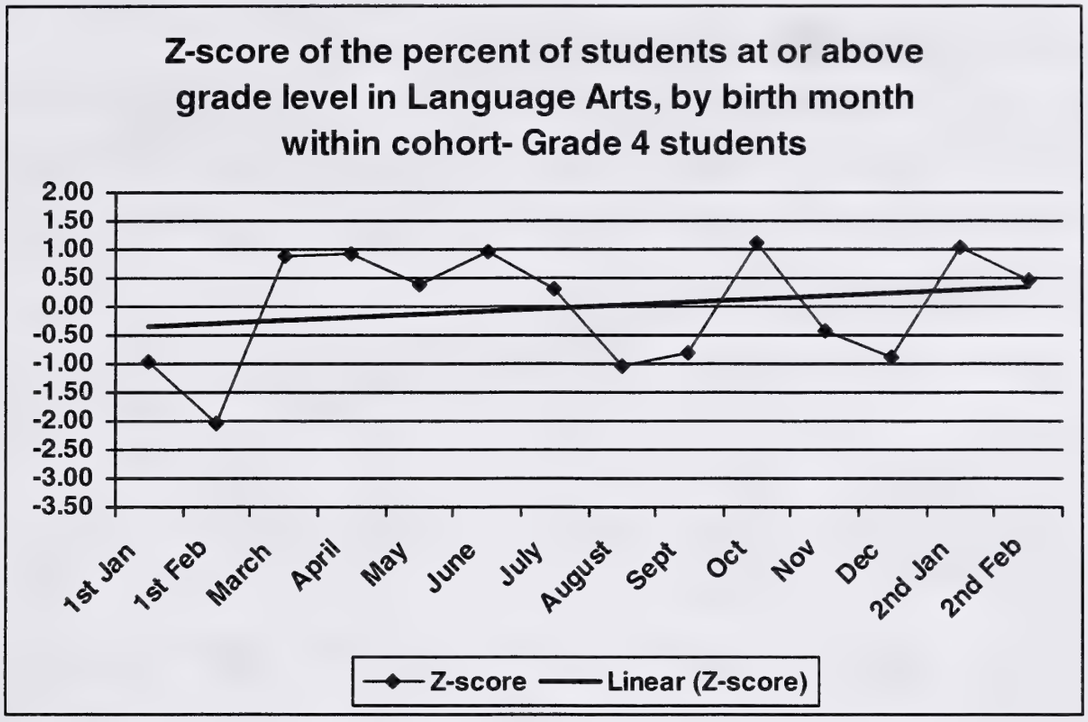

Z-score of the percent of students at or above grade level in Language Arts, by birth month within cohort- Grade 1 students
2.00
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
1st Jan
1st Feb
March
April
May
June
July
August
Sept
Oct
Nov
Dec
2nd Jan
2nd Feb
Z-score
Linear (Z-score)


Z-score of the percent of students at or above grade level in Language Arts, by birth month within cohort- Grade 2 students
2.00
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-2.00
-2.50
-3.00
-3.50
1st Jan
1st Feb
March
April
May
June
July
August
Sept
Oct
Nov
Dec
2nd Jan
2nd Feb
Z-score
Linear (Z-score)



The graph below demonstrates that when PAT scores are recoded into "percent at or above acceptable" to mimic the GLA data, the relative age effect remains. Notice the difference between the Grade 3 PAT trend line and the Grade 3 GLA trend line.





Discussion

While PAT data shows a notable relative age effect in Grade 3, the above charts show that the relative age effect, as measured by GLA data, disappears by Grade 3 and later grades. From Grades 6 to 9 the relative age effect is not apparent and appears to move in the other direction in English Language Arts with a larger proportion of younger students being 'at grade level' than older students. In the 2003-04 Beyond MIRS technical report the same effect is noticed although the relative age effect had disappeared by Grade 2. In Mathematics the relative age effect seems to have disappeared by Grade 2 in the 2005-06 data, and from Grades 7 to 9 appears to move in the opposite direction.

GLA for Students Missing PAT Data

In order to determine whether GLA provides useful data for students for whom PAT data was unavailable, GLA data for these students was analyzed. Relative to the Grade 3, 6 and 9 students included in the 2006 GLA data set, the following table defines the breakdown of student categories and percent of students lacking PAT results and the corresponding GLA results.

Table 43- Student Missing PAT Data Grade 3

		Student Code Groups						
		Non Coded	Severe	Mild/Moderate	Gifted and Talented	ESL – Cdn-born	ESL – Foreign-born	Total
Grade 3 English Language Arts Students	Total Eligible to write PAT	7,360	204	476	159	392	314	8,905
	% of students writing PAT	**95.8**	**68.1**	**59.2**	**98.7**	**96.9**	**86.9**	**93.0**
GLA of Grade 3 students with no PAT data	**%not writing PAT**	**4.2**	**31.9**	**40.8**	**1.3**	**3.1**	**13.1**	**7.0**
	Below Grade Level	118	47	167	0	2	24	358
	At Grade Level or Above	172	16	17	2	6	7	220
	No GLA	22	2	10	0	4	10	46
	% with no GLA	**0.3**	**1.0**	**2.1**	**0.0**	**1.0**	**3.2**	**0.5**
	% of students having info using GLA & PAT	**99.7**	**99.0**	**97.9**	**100.0**	**99.0**	**96.8**	**99.5**

Grade 3 English Language Arts GLA data provided data for 87% of the population for whom no PAT data were previously available. Further, when GLA data are substituted, data are unavailable for only 0.98% of the sub-population coded severe (compared to 31.9% missing PAT data). Similarly, using GLA means data are unavailable for only 2.1% of the students in the dataset coded mild/moderate (compared to 40.5% using PAT data). Similar findings for Grades 6 and 9 in English Language Arts are summarized below.

Table 44- Students Missing PAT Data Grade 6

		Student Code Groups						
		Non Coded	Severe	Mild/Moderate	Gifted and Talented	ESL – Cdn-born	ESL – Foreign-born	Total
Grade 6 English Language Arts, Students	Total Eligible to write PAT	7,360	242	696	247	208	295	9,048
	% of students writing PAT	**95.9**	**49.2**	**60.5**	**98.0**	**94.2**	**82.7**	**91.4**
GLA of Grade 6 students with no PAT data	**%not writing PAT**	**4.1**	**50.8**	**39.5**	**2.0**	**5.8**	**17.3**	**8.6**
	Below Grade Level	105	92	258	0	7	37	499
	At Grade Level or Above	187	26	10	5	5	7	240
	No GLA	10	5	7	0	0	7	29
	% with no GLA	**0.1**	**2.1**	**1.0**	**0.0**	**0.0**	**2.4**	**0.3**
	% of students having info using GLA & PAT	**99.9**	**97.9**	**99.0**	**100.0**	**100.0**	**97.6**	**99.7**

Table 45- Students Missing PAT Data Grade 9

		Student Code Groups						
		Non Coded	Severe	Mild/Moderate	Gifted and Talented	ESL – Cdn-born	ESL – Foreign-born	Total
Grade 9 English Language Arts Students	Total Eligible to write PAT	7,676	198	665	284	79	237	9,139
	% of students writing PAT	**95.6**	**33.8**	**50.7**	**98.2**	**93.7**	**76.8**	**90.5**
GLA of Grade 9 students with no PAT data	**%not writing PAT**	**4.4**	**66.2**	**49.3**	**1.8**	**6.3**	**23.2**	**9.5**
	Below Grade Level	82	66	233	0	1	30	412
	At Grade Level or Above	234	42	71	5	4	11	367
	No GLA	25	23	24	0	0	14	86
	% with no GLA	**0.3**	**11.6**	**3.6**	**0.0**	**0.0**	**5.9**	**0.9**
	% of students having info using GLA & PAT	**99.7**	**88.4**	**96.4**	**100.0**	**100.0**	**94.1**	**99.1**

As the charts above demonstrate, GLA provides data for nearly all students who would otherwise not have any data provided.

Conclusions

This analysis of the GLA data was undertaken to assess the validity, reliability and ultimately the utility of the GLA data for judging program impacts. The analysis has demonstrated that:

- GLA data may be aligned with pre-existing data in Alberta Education's Student Information System, such as student mobility (number of school registrations), students' birth month and students' gender in ways that add insight into the development of strategies to improve areas of weakness illustrated by this information.
- GLA data demonstrate that the overall distribution is leptokurtic[5] when applied to the general student population, indicating that most students are achieving at grade level. The 2003-04 data had a similar pattern.
- GLA data for sub-groups such as coded students has a greater, more normal distribution and wider variance that increases the utility of the data for judging program impact for these sub-groups (see graphs on p.20).
- Despite the fact that the relative age effect is apparent in the Grade 3 PAT, relationships between GLA and students' age indicate that while a relative age effect was found in grade 1, the effect has lessened by Grade 3 for ELA and Grade 2 for Math.
- The GLA by PAT analysis demonstrates that GLA data can supplement PAT data with reasonable reliability and validity, and with added depth for the purposes of program evaluation. This observation is particularly relevant for those grades that do not have PAT testing and therefore where GLA can serve to supplement PAT data.
- Gender differential analysis of GLA data show females outperforming males in Grades 2 -9 in English Language Arts, with significant differences in each of Grades 2-9, and also outperforming males in Grades 3-9 in Mathematics, although only significantly in Grades 6-9. When gender differences are shown for students with severe or mild/moderate disabilities the reverse pattern emerges as males are generally outperforming females.
- GLA data provides important information for students in Grades 3, 6 and 9 who did not write the PATs thus filling a critical gap in the student achievement database. Of all the severely disabled students with no PAT data, the GLA provides data for approximately 30% of students in Grade 3, 48% of students in Grade 6 and 54% of students in Grade 9 who would otherwise have no information.

Future Report Purposes and Formats

Data analyzed in this report is from the 2nd pilot (2005-06) of GLA implementation, and as noted in the limitations section has restrictions on its generalizability due to a lack of randomization in the underlying sampling process. Beginning in the 2006-07 school year a minimum of 1/3 of schools in each jurisdiction will be reporting GLA to Alberta Education in Language Arts and Mathematics, and in the 2007-08 school year all jurisdictions, Francophone Authorities and Charter Schools will be reporting GLA (for these two subjects and where applicable for French Language Arts). Consequently, the report on the 2006-07 GLA data will start to apply the data

[5] As described at http://www.isixsigma.com/dictionary/Leptokurtic_Distribution-286.htm, "A leptokurtic distribution is symmetrical in shape, similar to a normal distribution, but the center peak is much higher; that is, there is a higher frequency of values near the mean."

to program evaluation purposes. The report on the 2007-08 data will have a very strong orientation to program evaluation functions and analysis of related data that can provide additional information on how students can be best served when factors that influence student achievement are identified and analyzed.

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